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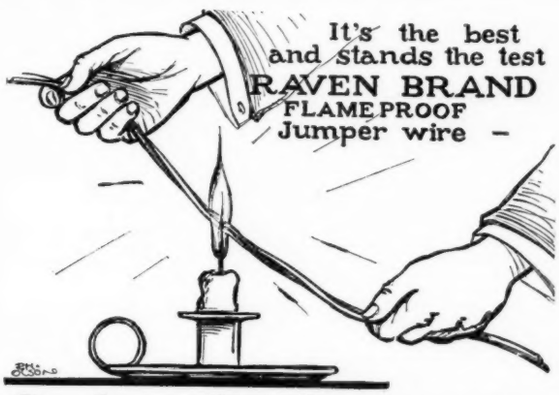

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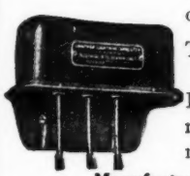

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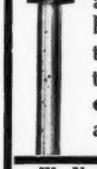

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Telephony.

THE AMERICAN TELEPHONE JOURNAL

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Is Confession Good for the Soul?

The leading article in the current issue of the Western Electric News, which is the readable and up-to-date house organ of the Bell factory, is entitled "The Western Electric Co. and Its Relation to the Bell System," and its author is H. B. Thayer, the president. In an interesting way the story of the organization and growth of the company is told, and great pains taken to describe how the Western came to be the manufacturing branch of the Bell. The present relationship between the factory and the Bell operating companies is justified by Mr. Thayer on the grounds of economy and efficiency. He does his best to demonstrate that the Western Electric Co., acting as purchasing agent and storekeeper for the Bell licensees, is doing a grand and noble work.

The appearance of this article just at this time is most significant. It sounds like the defense of one accused of questionable proceedings who expects to be called to account. From the standpoint of the American Telephone & Telegraph Co., no doubt, Mr. Thayer's plea of justification reads like gospel truth, but it is certain that many of the Bell licensees will not agree with all of his arguments. It is one thing to compel a man to buy in one place and another to convince him that it is all for his best good.

Naturally, Mr. Thayer skims very lightly over the Western Electric invading the Independent telephone field. That presents such a glaring example of unfair competition that he, no doubt, decided that the less said about it the better. After praising the value of standardization of apparatus, he speaks of Bell connections with companies having other types of equipment.

"They could be connected together," writes Mr. Thayer, "but not as efficiently and economically as though they had all been designed to work together. It became clearly advisable that such companies as might ultimately connect with the Bell telephone system should have the opportunity to buy Bell standard apparatus, and as there was no way of predicting which companies would ultimately so connect it was decided that all should have the opportunity, and restrictions on this company's sales were removed in October, 1907."

How philanthropic! Probably no Independent telephone man ever before dreamed how kind and charitable the Bell interests were. Now we know why Western salesmen and Bell operating staffs have left no stone unturned in order to sell Bell apparatus to Independents. That was why the Bell factory has forced sample telephones on Independent companies, and worked every trick possible to steal business from Independent manufacturers. Mr. Thayer, by the way, says nothing about the Western's announcement that it had withdrawn from the Independent field. We cheerfully give him credit for that candid omission.

Space forbids reprinting all of this semi-confession of the Bell-Western Electric alliance, but there are sentences that will especially interest Independent telephone men. For instance, speaking of the gradual rounding up of all Bell companies under the Western Electric contract, the article says:

"There was created an obligation upon the telephone company to buy its telephones from the Western Electric Co., but there was no obligation upon its licensees to buy anything from the Western Electric Co. The obvious intention was to create a source of supply for the licensee companies, but to leave them free to use it or not."

That is surely rich! *A* can take *B* out in the middle of Lake Michigan, throw him overboard and advise him: "Now, I am not making you swim. If you prefer, you can sink. Far be it from me to coerce you into swimming. You are perfectly free to swim or not."

The licensee company which did not buy Western Electric apparatus would certainly have a pleasant time. That kind of talk would not fool anybody—certainly not the federal department which is supposed to have an eye on public utilities.

Again referring to the relationship between the Bell companies and the Western Electric Co., Mr. Thayer says: "At first, with the best intentions, we were distrust-

ful of each other. At first we failed to get all the economies because each party spent too much money in watching the other, and we did not get the efficiency because we had not developed far enough our understanding of the telephone company's problem. Gradually we learned how to do the job and very soon we learned that the plan was efficient in proportion to the confidence which each party had in the other and to the extent to which they cooperated."

This is sad, sad news, indeed. It is, in fact, almost incredible that one Bell department should be so suspicious and unfeeling as to "distrust" another Bell wing. Being a part of the great "universal system," and knowing intimately the grand, uplifting, philanthropic work the Bell organization is engaged in, it is hard to believe that any Bell man should distrust another. Perhaps, though, the licensees thought there would be more "hold-up" than "uplift" in the relationship under discussion. What a cold, unsympathetic world it is, after all!

Speaking seriously, however, it is a well known fact that Bell licensees still retain that feeling of distrust mentioned by Mr. Thayer, and the disorderly, unfair tactics of the Bell factory in invading the Independent telephone field have not modified that dissatisfaction a whit.

In concluding his article, Mr. Thayer says: "You will see by what I have said that there is no mystery in the relation between the Western Electric Co. and the Bell telephone system. It is a part of the growth of the telephone service and embodies the most practicable relation between the manufacturing and operating departments of a service which has developed faster and fills a larger field and is more universal in its relation with the public, than any other. The development of telephone service to give the greatest benefit to the public required such a relationship as has existed and does exist between us and the operating companies."

No! We grant that there is no mystery about the Bell-Western Electric alliance. It is plain as day. It is a both-ends-against-the-middle game that is not only not mysterious but is as bald and raw as a would-be monopoly could devise. We also admit the rapid growth of the telephone, but we contend that the Independents, not the Bell, are responsible for this wonderful development, and why they should be crucified by the unfair competition of the Bell is impossible to fathom. By its irregular ownership of the Western Electric Co., the American Telephone & Telegraph Co. may compel Bell licensees to buy from that factory, but it certainly has no legal or moral right to practice the unspeakably unfair competitive methods it is displaying in the Independent field.

The Land of the Fighting Chance

By HERBERT KAUFMAN

Many a man believes himself a Christopher Columbus only to find in the end that he has been following a well-established excursion route. Because a condition is new to you it is not necessarily a novelty to the rest of us.

Despite quotation compilers and copy-book publishers, it is the little minds and not the great minds that run in the same channels.

At this very moment, trains are rushing from all points of the compass bearing manuscripts of amateurs quite assured that their hackneyed and threadbare thoughts are expressions of primary originality. Oodles of applications are annually made for patents upon devices which have been in active use since Hector's first bark.

Real ideas never go begging. Unique conceptions and contraptions find eager audiences and markets.

The quest for genius is a ceaseless hunt. Inept presentation occasionally retards the acknowledgment of meritorious men and methods, but all valuable contributions to the welfare and happiness of humanity are eventually estimated at their due worth.

Tirades about "no opportunity" and "an unappreciative public" and "the inside track" and "blocked endeavors" are maudlin blurb—figments of vain, morbid imaginations. There is much injustice between individuals but as a community, we're too busy to persecute anybody—we haven't time enough properly to 'tend our own business, much less interfere with yours.

What, with a war-quake in Europe, the Mexican mix-up, a Presidential election, the potential moves of Japan, prospect of 40-cent gasoline, scarcity of trained labor, freight congestion, high cost of living, and the servant-girl problem, you must really excuse us if we are inattentive to your delusions.

If you still entertain an ambition to participate on any considerable scale in general affairs, alter your attitude, and accept this truth: Men of genuine force and character are too occupied in battling for their rights to pause for whines about their wrongs. No one who gives himself an honest chance indicts the times of favoritism.

Two humbly-born Presidential candidates, countless self-made multi-millionaires and the majority of leaders in all avenues of endeavor, deny by their careers, that either pull or capital are essential to success.

America is and will always be a country of open opportunity—The land of the Fighting Chance.

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Transmission and Its Importance in Exchange Operation

An Exposition of the Basic Facts of a Subject About Which the "Non-Technical" Man Is Usually Anxious to Know Something—Transmission Studies—Local and Toll Telephonic Transmission—Published Through Courtesy of The Transmitter

By C. E. Creecy

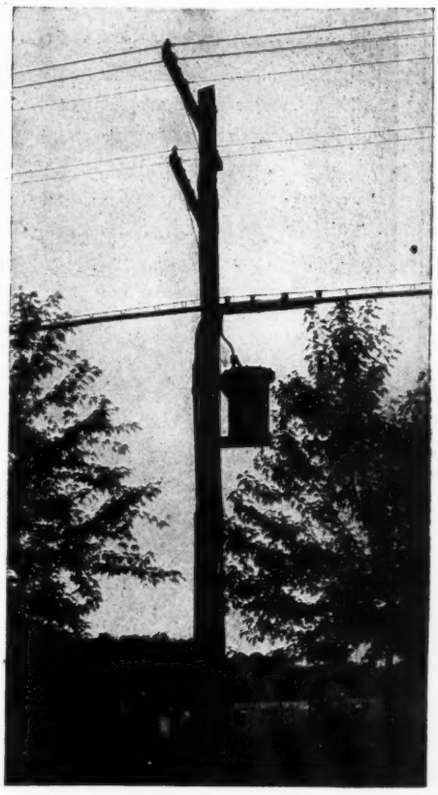
The ability to hear words spoken over the telephone depends largely upon two characteristics of the voice received at the listening end—its loudness and its quality. The study of telephone transmission deals with these two factors, and their combined effect is known as transmission. If a telephone conversation is easy to understand, transmission is said to be good.

General studies of transmission were not attempted in the earliest years of telephone work. They were not necessary in connection with short open wire lines. Cable circuits, however, do not "talk" as well as open wire circuits, and with the increasing use of cable circuits and the increasing distance over which people wished to talk, it became necessary to study the means of improving the voice received at the listening end of the circuit.

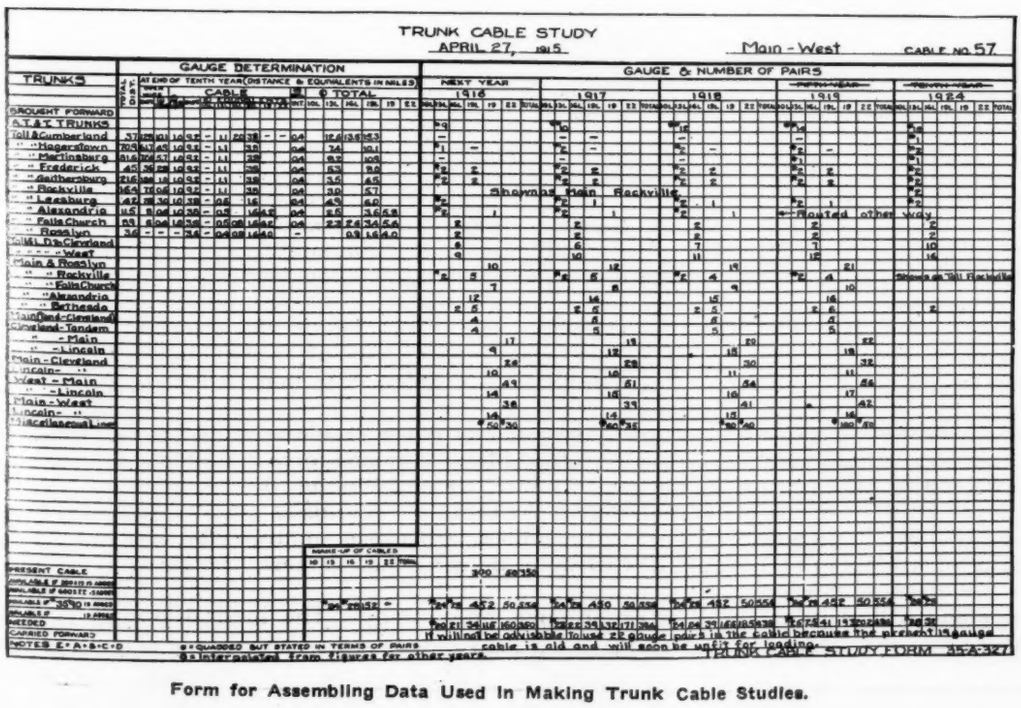
The first question was to establish a means of measuring transmission. In other words, to establish what corresponds in transmission to the foot rule as used in measuring length. The mile of standard cable was arbitrarily adopted as such a foot rule, and measurements of transmission are now made in terms of the mile of standard cable.

Once the means of measuring transmission had been established, it became necessary to fix what should be considered the "commercial" limit of transmission. This was done by a series of tests in which conversations over various amounts of standard cable were held, and by consideration of the transmission obtained, and cost of obtaining it, the "commercial limit" was arbitrarily determined. These tests were made first by the engineers and finally by the executives of the telephone companies.

The tests have been repeated from time to time, as additional information regarding the cost of giving better grades of transmission has become available, and as ideas of what grade of transmission should be given have gradually improved. The results of these tests have given better and better transmission limits until at the present time in new design work 35 miles of standard cable is considered as the limit for commercial transmission on the longest calls. The improvements which have been made can be appreciated when it is realized that transmission with the original telephone instruments used by Dr. Bell, with the transmitter and receiver connected directly together, gave an equivalent of 45 miles of standard cable; that is, we are now designing plant so that the worst connection will be ten miles of standard cable better than the shortest and best possible connection with the original instruments.



Aerial Cable Loading Coil Cases.

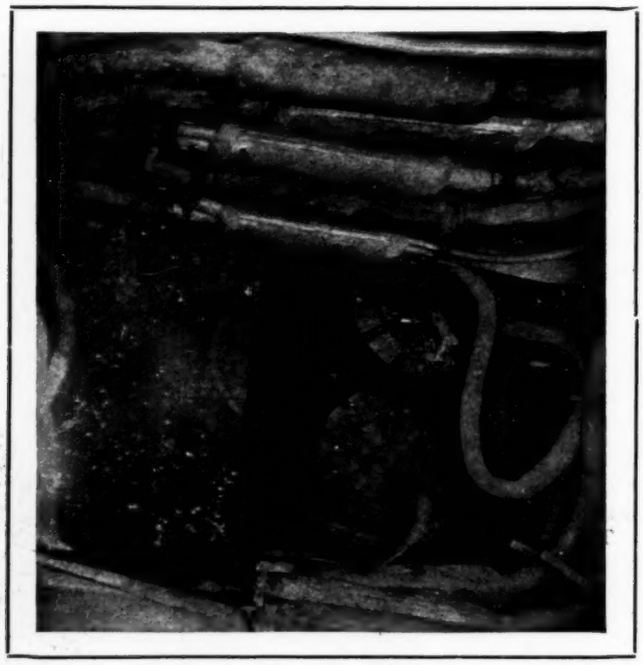


Form for Assembling Data Used in Making Trunk Cable Studies.

Transmission losses are additive; that is, if a trunk from Salisbury to Baltimore has a loss of seven miles of standard cable, and if the toll board in Baltimore has a loss of one mile of standard cable, and if a trunk from Baltimore to Cumberland has a loss of eleven miles of standard cable, a connection

set up through a Baltimore toll board from Salisbury to Cumberland will have a transmission loss or transmission equivalent of seven miles, plus one mile, plus eleven miles, or a total equivalent of nineteen miles of standard cable.

From a transmission point of view, telephone circuits can be divided first into two classes—good and bad. The



Manhole with Loading Coil Cases Containing 154 Loading Coils.

second class comprises grounded circuits; old and badly corroded metallic circuits; circuits with hand joints; circuits with poor insulation due to trees or limbs touching the wires, due to broken insulators and untied wires, poor bridle wire, leaky cable, leaky cable boxes, etc.; circuits badly exposed to noise from light or power wires, central office circuits (over which long-haul connections must be held) not supplied with the proper monitoring circuits, etc.

All of these defects of circuits in the class called "bad" are defects having variable influences on transmission; that is, we cannot predict beforehand what the influence will be, and therefore cannot state it in terms of the foot rule, the mile of standard cable.

There are, from a transmission standpoint, many grades of good circuits. They are classed as "good" because we can tell beforehand what their transmission equivalent will be, whether large or small, and can therefore properly design a plant for the whole territory, with which we can be reasonably sure of giving satisfactory service between any two points which wish to talk. The good circuits can be divided, in the general order of their transmission value, into six classes:

1. Non-loaded cable circuits.
2. Non-loaded open-wire circuits.
3. Loaded cable circuits.
4. Loaded open-wire circuits.
5. Loaded cable circuits, designed for use with repeaters.
6. Loaded open-wire circuits, designed for use with repeaters.

In each of these six classes, the transmission of the circuit is improved by increasing the size of the conductors, by placing two conductors of a circuit farther apart, by loading the conductors, and by the use of repeaters.

It is apparent, however, that all of these changes to improve transmission increase the cost of the circuit. This is the third factor in transmission studies. As soon as the means of measuring transmission had been established and an attempt was made to establish what should be considered as "commercial limits," the question of cost had to be considered.

General transmission studies are complicated by expected improvements in apparatus, by the question of traffic routing, and by the changing ideas of what should constitute commercial transmission.

In making such a study, it is customary first to assume the types of apparatus, the limits of commercial transmission and the routings and then design a plant, so that points which wish to talk to each other will be able to do so if the assumptions made are correct.

A telephone plant consists in general of:

First, subscribers' loops; that is, lines from central offices to subscribers;

Second, trunks; that is, lines between two central offices, and

Third, central offices, or means of connecting subscribers' lines, trunks to trunks, or subscribers' lines to trunks.

Assuming 30 miles of standard cable as the maxium allowable transmission loss on a connection between a subscriber in one central office and a subscriber in another, the question of how much of this loss shall be used up in each subscriber's loop and how much shall be used up in the trunks and intervening central offices is entirely determined by the question of cost.

Assume the simplest cases, that is, a plant consisting of two central offices, one trunk and two subscribers' loops. A design for this plant is made allowing, say, 17 miles of transmission loss in the two subscribers' loops, two miles of loss in the two central offices, and eleven miles of loss in the trunks. Figures are made showing the cost of the plant under these assumptions.

A second assumption of 20 miles' loss in the two subscribers' loops is made and the corresponding loss in the trunks assumed; figures are made of the plant cost under this assumption.

A third assumption of 14 miles of loss in the subscriber's loop is made, the trunk loss adjusted to fit this subscriber's loop loss and the cost of plant under this assumption determined.

From an inspection of these three costs, it is possible to determine which layout is the most economical for providing 30-mile transmission between the two subscribers.

This system, when applied to a telephone system comprising hundreds of central offices and thousands of subscribers, becomes tedious, but although the work of applying it is great, the same simple basic principles are used.

As the number of subscriber lines is very much greater than the number of trunks, and as the length of the subscribers' lines is very much less than that of the majority of trunks, the method described in the last paragraph results in a design with very small gauge—that is, cheap conductors for the subscribers' lines—and in larger gauge conductors for the shorter trunks, and so on as the trunks become longer until we reach the extreme cases where heavy open wire copper leads are loaded and used with repeaters for the very longest haul business.

Theory and Practice.

After a theoretical plan for a given territory has been established, having certain maximum transmission losses, and therefore using certain types of conductors for subscribers' lines in each central office and for trunks between each of two central offices, the attempt is made in construction work to keep the actual plan reasonably near the theoretical plan which has been designed. In a great many cases it is impossible or inadvisable accurately to

follow the theoretical plan, because of difficulties which were not forseen at the time the theoretical plan was made, and because improvements in the art have occurred which make it cheaper to obtain the same result by using other means.

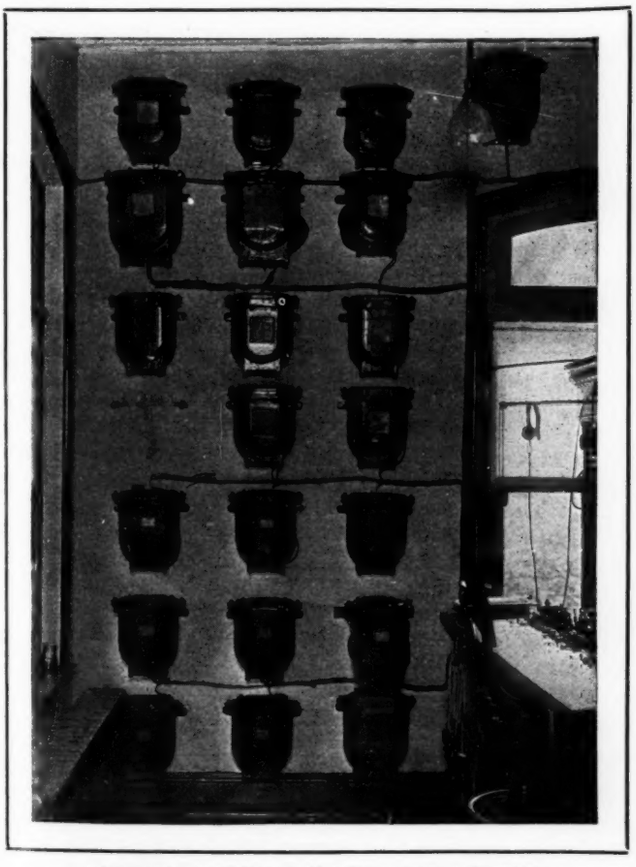
The character of the telephone business changes so rapidly that a transmission study is ordinarily obsolete within five or ten years of the time at which it was made, and it becomes necessary to do most of the work over again.

Of course, the transmission end of each circuit construction job is considered before the work is done, and the original general transmission study is only used as a general guide.

On an ordinary trunk construction job, the theoretical equivalent of the trunk which was decided by the transmission study is taken into account. We then determine what form of construction, open wire cable, loaded or non-loaded, etc., will be necessary to give this equivalent. If a large saving in money can be made by constructing a circuit with a slightly smaller equivalent, or if the large transmission saving can be made with but slight additional expenditure, the greater saving is, of course, made at the expense of the smaller loss.

Certain conditions which are found in ordinary construction work sometimes prevent the application of the method just shown.

Circuits, in general, are made up entirely of open wire or partly of open wire and partly of cable, or all of cable.



Open-Wire Loading Coil Cases at Tuxedo, Md.

Except for circuits used on comparatively long-haul connections, circuits all in open wire will have a sufficiently low transmission equivalent, because in order to get sufficient mechanical strength to prevent the wire from breaking during storms, wire which is large enough to give this equivalent must be used.

The associated Bell companies ordinarily use copper wire .104 inch in diameter for their open-wire trunk construction. If it is necessary to talk for greater distances than is possible with .104 copper, the most economical means of improving transmission ordinarily is to load the circuit. This loading, which consists in adding inductance or choke coils at definite intervals along the circuit, can be done at any time after the circuit has been placed, so it is often better, even though we are fairly sure at the time of the placing of the circuit that loading will be necessary, to wait until records of the traffic over the proposed circuit can be obtained to see whether loading will be justified.

A Study Necessary.

In the case of trunks entirely in cable the size of the conductors is not limited by mechanical considerations, but is determined entirely by the questions of cost and transmission. A transmission study of the trunks involved must, therefore, be made before the cable can be designed. If the cable and trunks are short, the cable design is based almost entirely upon the general transmission study of the territory involved.

If a long toll cable is under consideration, it is often advisable to remake the general transmission study for the territory involved, because the cost of the proposed cable may cause important changes in that study.

The design of the cable which will carry trunks out of a city to open wire lines beyond the limits of the city presents one of the most difficult questions, that is: How far will the cable be extended during the life of the portion which it is proposed to place immediately? As the transmission equivalent of cable conductors is considerably greater than that of open wire, this point must be determined fairly accurately, or else we must allow ourselves a large transmission margin in designing the proposed section of cable.

The ordinary toll cable is designed for a period of about ten years. The attempt to estimate how great a distance the inability to obtain trimming, the growth of the city, and the wishes of the city authorities will force us to take down open wire and extend the cable during this period is a job closely akin to guessing which one of a bunch of horses will come in first in a steeple-chase.

In making a cable study after the transmission limit for each trunk has been fixed, a tabulation for each trunk is made up on a form, similar to that shown in an accompanying illustration, as follows:

Each group of trunks is shown in the first column. The total transmission equivalent of each trunk is figured and shown in the columns under the heading "Gauge Determination."

These totals are made up for each gauge of cable which there is a chance of using for each trunk. The other columns show for each of a series of years the number of trunks and the gauge conductors which they will use.

The total number of conductors of the different gauges needed in the years covered by the tabulation are shown on the next to the last line, and standard cables available to fill these needs are shown in the last column on the two lines above the needs. This arrangement ordinarily shows at a glance what cable should be used.

When the demand for long-haul telephone connections first began, the only available means of improving transmission was to increase the size of conductors. The limit of this means of extending the range of ordinary communication was soon reached because of the increased cost.

Early in the history of the telephone, Sir Oliver Heaviside, an English physicist, pointed out that inductance added to a telephone circuit could be made to balance the

injurious effect which the electrical capacity of these circuits had upon voice currents, but it remained for M. I. Pupin to show the method by which inductance could practically be added to a circuit by inserting choke or loading coils at definite intervals along the line. After the development of Prof. Pupin's idea had been completed by the A. T. & T. Co., and practical loading coils worked out for use on telephone lines, it was found possible by the addition of these coils to increase the distance over which one could talk by from two to seven times that possible with the same construction but without loading.

Placing Loading Coils.

This was, of course, the greatest step forward that had been made in long distance telephony. At the present time practically all long-haul connections are made over loaded trunks. As the loading coils must be placed at definite intervals along the circuits, we naturally find them in many curious places—on poles, in manholes, buried in the ground and placed under water in connection with submarine cables. The accompanying illustrations show some of these types of construction.

In one illustration the loading coil case on the pole contains 11 side circuit loading coils and five phantom loading coils. A case in the ground reached by the vertical cable on the pole, contains 56 side circuit coils. The view of the manhole interior, shows loading coil cases containing 154 loading coils. At Tuxedo, a junction point near Baltimore, the location of the building made it possible to place the open-wire loading coil cases inside, although they are ordinarily mounted on a pole.

An alternating electric current is one in which the current changes direction periodically; that is, the current at one instant is flowing in one direction, then decreases to zero and builds up in the other direction, then decreases to zero and builds up in the first direction, etc. The period from the time when the current is flowing to the right until after changing to the left it is again flowing to the right, is known as a cycle. Ordinary electric light and power alternating current completely change direction and change back 60 times per second. They are called 60-cycle currents.

Telephone voice currents are alternating currents, but instead of having a single important frequency, like light and power currents, they are made up of currents of differing frequencies. A voice current from a deep bass voice is composed largely of the lower frequencies. A voice current from a high soprano voice is composed largely of the faster or higher frequencies.

The most important frequencies of voice currents range from 200 to 2,000 cycles per second. All of these frequencies may exist in any voice and the characteristics of the voice which make it recognizable and understandable are dependent upon the proportion in which these different frequencies are present.

At the beginning of this paper it was explained that transmission depended upon two characteristics of the voice received: first, its loudness; second, its quality. The loudness of a voice at the listening end of the telephone circuit depends upon the amount of voice current, irrespective of frequency, which is transmitted over the line. The quality of the received voice depends upon the relative loudness of the various frequencies transmitted over the line and is independent of the total current.

Loading a circuit increases the loudness of the received voice, but even with a loaded circuit the loudness is appreciably decreased with increasing the length of line. Loading not only increases the loudness but improves the quality.

Ordinarily, non-loaded telephone lines have more capacity than is desirable and cause greater transmission losses to the higher frequencies than to the lower frequencies, and thus distort the voice and injure its quality. The loaded line, as at present designed, is intended to cause as little distortion as is practically possible, and even with great lengths of line very little distortion occurs if the line is accurately loaded. The limitation on long distance telephony, when loading is used, is therefore due to decrease in loudness rather than to decrease in quality.

In order to take care of the limitation, telephone repeaters have been designed for use on the very longest haul connections. These repeaters are devices for increasing the volume of received talking currents without changing the quality of these currents. Of course, neither the loaded line nor the repeater is perfect. Both, because of the limitations of practice, cause changes in the quality of the voice, but theoretically we now have a means of transmitting a voice current without distortion over any distance, and whenever this voice current becomes too weak, a means of raising it either to its initial volume or to a greater volume.

This means that the largest part of the general basic research work to make long distance wire telephony a possibility, no matter how great the distance, has been completed. The principal job which is left us is to care for minor improvements, install enough apparatus to care for the demand, and keep the apparatus and circuits in the class designated, in the first part of this article, as good.

Farmers to Discuss Government Ownership at Indianapolis.

The Farmers' National Congress of the United States has been engaged for a year in a study of government ownership of telephones and telegraphs, through the researches of a committee appointed for that purpose at the Omaha session of that body last September. This report, which will be submitted at the 36th annual session of the Farmers' Congress at Indianapolis, Ind., October 17 to 20, is said to be the most comprehensive study of this subject ever made from the standpoint of the farmer.

The committee having this subject in charge is said to have covered the whole field of government ownership of telephones and telegraphs as related to the agricultural interest, after extensive researches into the records of all government ownership countries. While the committee prudently declines to make public its findings in advance of its report to the Congress, it is reported that this report will establish a new and accurate basis of facts from which to study the problem of government ownership.

A general invitation has been extended by the officials of the Farmers' National Congress to all interested persons to attend the Indianapolis meeting, at which 2,000 farmers are expected from the entire United States. Independent telephone men will do well to note this event and plan to attend.

Earnings of Ohio State Co. for July Show Increase.

The Ohio State Telephone Co., of Columbus, Ohio, reports gross revenues for the month of July at $302,428, as against $274,970 for July of last year. The expenses, including taxes and insurance, amounted to $176,040, against $154,488, leaving the net income $126,387, against $120,472 in July, 1915. Deducting fixed charges of $50,508, against $46,514, leaves net earnings of $75,879, compared with $73,968 in July of last year.

Dividends paid on the preferred stock amounted to $26,671, against $26,087, leaving the balance available for financial requirements of the company, and dividends on common stock as $49,208, compared with $47,880 for July of last year.

Fundamental Principles of the Telephone Business

A Reading Course Designed to Present Logically the Principles Which Underlie Successful Organization and Operation of Telephone Properties—Prepared Under the General Supervision of Stanley R. Edwards—Part I, Telephone Economics, by James H. Shoemaker, Completed June 26, 1915—Part II, The Corporate Telephone Organization, by J. C. Kelsey and S. R. Edwards, Completed September 25, 1915—Part III, Telephone Accounting and Auditing, by James H. Shoemaker, Completed January 15, 1916—Part IV, Telephone Finance, by J. C. Kelsey and S. R. Edwards, Completed June 3, 1916—Installments Now Being Presented Comprise Part V, Telephone Advertising and Publicity, Written by Roy D. Mock

Quiz Questions on the Preceding Installment.

62. Discuss pertinency as the third criterion to be applied to an advertisement.

63. What kind of an advertisement may be said to be a persistent one? What use may be made of it?

64. Why should an advertisement be consistent with the policy of a telephone company?

65. Discuss the value of constructive thoughts in an advertisement.

66. Why must a telephone advertisement be more than simply truthful?

67. What is sincerity in an advertisement and why is it essential?

68. Discuss the necessity for carefully laying advertising plans and carrying them out.

69. What should be done before planning an advertising campaign? Discuss the amount of the appropriation.

CHAPTER VII. Planning a Campaign (Concl'd.)

70. *The Budget for Newspaper and Other Advertising and Publicity.*—Having decided upon the amount of the advertising appropriation, the next step is to settle upon the various kinds of advertising that should be done and to decide how much money should be devoted to each medium. The big bulk of the appropriation should be devoted to newspaper advertising because, almost without exception, people who are prospects for telephone service are progressive enough to want to keep in touch with affairs. This means they are newspaper readers. Also newspapers control public opinion to a great extent and their judgment is very likely to be biased in favor of a telephone company which is a liberal buyer of their advertising space. In case of any controversy over a raise of rates, etc., it is well to have this editorial co-operation on the part of the newspaper.

The life of an issue of a newspaper is short. A daily paper lives only 24 hours and a weekly newspaper less than a week. But the influence of a newspaper is far-reaching and long-lived. The importance of the newspaper in an advertising campaign may be judged from the following paraphrase of a parable which is almost a classic in advertising circles.

A Parable.

Behold an advertiser went forth to sow.

And as he sowed, some seed fell into hand bills and dodgers and the street cleaner came and gathered them up.

And some fell into cheap circulars, and they were gathered into waste baskets and burned. Some fell amongst programs, and the people being more interested in being amused by the performance than in reading about telephone service, crumpled up the programs and threw them on the floor.

And some fell among fake schemes, whereupon popular contempt sprang up and choked them.

But some of the seed fell into legitimate newspapers which found their way into the homes of people who had time to read them. This seed sprouted and brought forth fruit in abundance.

The advertising budget should state how much money it is planned to expend in blotters, letter inserts, advertising novelties, programs, motion picture slides, and on the various forms of publicity such as exhibitions at fairs, carnivals, street parades, reading notices in newspapers, lectures, year books, etc. It is the purpose of this series to discuss these various forms of advertising and publicity so a more specific value can be placed on each one and a more definite advertising schedule arranged.

71. *Purposes of Telephone Advertising.*—A point that must come up in planning an advertising campaign is deciding upon the purpose which the advertising is meant to accomplish. The military strategist decides what he wants to accomplish and then instructs his gunners as to what ammunition will best achieve the purpose. So the telephone strategist should decide what purpose he wants to accomplish and then prepare his advertising along these lines.

In general, the purpose of telephone advertising will classify somewhat as follows. Local conditions may add other purposes of advertising, however.

1. To secure new installations.
2. To promote the use of extension telephones.
3. To increase toll line business.
4. To promote the more extensive use of the telephone. In localities where telephone charges are based on the number of calls, to increase the number of calls means increasing the revenue of the company. In communities where a flat telephone rate is maintained, increasing the use of the telephone will not add anything to the revenues of the company, but it will make the telephone more indispensable to subscribers, and consequently make the business of the telephone company more stable and secure. The increased use also paves the way for installing additional telephones.
5. To increase good will. Good will is the most valuable asset a telephone company can have. It is more valuable than plant equipment because plant equipment can be replaced.

When good will is once lost, however, it is difficult, indeed, to get back into the good graces of the public. In case a telephone company is operated under a franchise, when the franchise comes up for renewal it is worth a great deal to have the people on the side of the company. In case a readjustment of

Dunkirk Home Telephone Service
The "Dunkirk Home Telephone" system has brought the price of telephone service within the reach of every home, it stands by you in emergencies, does your shopping, guards your home does your errands, makes your social engagements, calls the doctor, in fact it is invaluable to the household. Just think of the many advantages you get from the "Dunkirk Home Telephone Service"
Call 24 and let us tell you more about it.
DUNKIRK HOME TELEPHONE CO.
The People's Telephone"
G. W. Van Stone, Manager.

Fig. 55. Exposition of a Company's Business Platform.

rates is necessary, it is worth all it costs to get the people to agree with the contention of the company.

The matter of public relations is one of constantly-increasing importance and public utilities, according to the present trend, will devote considerably more attention to it in the future than has been accorded in the past.

A Bell Telephone for Christmas
A TELEPHONE as a gift of lasting utility, will please the whole family throughout the year And—
The Teleplone man is now busy installing Bell Instruments which will be connected at Christmas time.
Call the Manager's Office today for information about low residence rates.
Every Bell Telephone is a Long Distance Station
The Missouri & Kansas Telephone Co.

Fig. 56. Suggesting the Telephone as a Gift.

6. To promote a better understanding of the use of the telephone.

CHAPTER VIII. New Business Advertising.

72. *Seeking New Business.*—Every telephone company must constantly keep after new business. Even though loaded to capacity, it would still be the part of shrewd business to do this since people are constantly moving away from town and others must be induced to contract for telephone service to take their places.

A telephone company which for a single month relaxed its efforts to get new business would soon find itself on the downgrade.

The most natural way to go after new business would seem to be through the columns of the local newspaper. Practically everyone worth while subscribes for the newspaper and usually

The Stock Industry and the Telephone
No single industry derives more benefit from a comprehensive telephone service than does the stock business.
Telephone service unites the breeder, the shipper and the market in a community of interest.
The market uses telephone service in canvassing the territory of supply.
The breeder uses telephone service in keeping in touch with demand.
The shipper uses telephone service to keep himself informed as to market conditions.
The ranchman uses telephone service in the economical handling of his stock on the range—in feeding, in negotiations with buyers and in securing cars and making other shipping arrangements.
Altogether, comprehensive telephone service is a valuable factor in the growth and development of the stock industry.
STOCK SHOW WEEK IN DENVER
January 16th—23rd
SPECIAL LOW RAILROAD RATES
Of Course, You Are Coming.
The Mountain States Telephone & Telegraph Co.

Fig. 57. An Appeal to a Specific Class of People.

it is only with the worth-while people of a community that a telephone company can hope to do business. In Figs. 55-60 are reproduced a number of advertisements designed to secure new installations of telephones.

73. *Two Types of Newspaper Advertisements.*—A very good, brief exposition of the business platform of a telephone company is given in Fig. 55 while Fig. 56 suggests the use of a telephone as a Christmas gift. The thought in this advertisement is fine, but it would have been much stronger if the illustration had contained more of the Christmas spirit. A picture of Santa Claus with a telephone in his pack would have sug-

gested a telephone for a Christmas gift—proposed it better than a series of pictures showing various members of the telephone company's organization at work.

74. *Advertisements Addressed to Specific Lines of Endeavor.*—A good example is given in Fig. 57 of how specific lines of endeavor can be gone after in an intensive way to secure new installations of telephones. This advertisement is particularly good. It points out the various ways in which the telephone can be used in the stock industry.

A series of similar advertisements could be written pointing out the use of the telephone in various other industries. One series might be addressed to farmers, another to grocers or retail merchants of various kinds. If in any town a certain class of mechanics or business men predominate, a profitable series of advertisements might be addressed to them. In Fig. 57, the advertisement addressed to the stock industry, the stockman feels that this advertisement is for himself only and of no interest whatever to the mechanic or business man who resides in the city. He feels proud to have his particular business recognized in such a manner.

As an interesting side-light on this subject, the writer recalls a full-page newspaper advertisement which was run in the East a few years ago addressed personally to a certain individual. It appears that the concern which paid for the advertisement had been trying to get to the ear of this man for some time, but without success.

It felt that he would surely read an advertisement which started off addressed to him personally. If he did not see it himself in the paper, it would certainly be called to his attention by his business associates. So this concern contracted for this full page of expensive newspaper space and told its story to this one man—related the story that salesmen had been trying to tell him for months. The plan worked. Everybody loves a good sport—one who will go to extreme length to get what he wants.

(*To be Continued.*)

To Erect Addition to Present Exchange at Youngstown, O.

The Ohio State Telephone Co. has broken ground for a 30 by 60 ft. two-story addition to its present building in Youngstown, Ohio. The company has filled and is fast outgrowing the present building, which it has occupied but six months. The new building will be slightly more than one-half as large as the present building at 21 East Rayen avenue, Youngstown.

While the present building seemed large enough, when it was occupied, for the needs of the automatic exchange and offices for some time to come, the reception granted the automatic service by Youngstown patrons is such that every available foot of space in the building has been taxed to the limit, and it is necessary to build an addition to take care of the growing business.

The addition will be two stories in height and will have a basement which will furnish added storage facilities and sufficient space for enlarged storage batteries. When the new building is finished there will be approximately 5,500 square feet of additional floor space. This space is sufficient to enable the company to take care of a total of 15,000 automatic telephones from that building. The new addition is expected to be completed within three months.

The automatic equipment was cut into service in Youngstown in January of this year, and since that time the number of telephones in service has increased more than 50 per cent.

Meeting of Pennsylvania Independents at Harrisburg.

A joint meeting was held by the Eastern Pennsylvania Independent Telephone Association, the Western Pennsylvania Independent Telephone Association and the Eastern Traffic Association at Harrisburg, Pa., on Tuesday and Wednesday of last week, September 5 and 6. Questions applying to toll service, such as the initial period, night rates and methods of computation, were considered.

The service committee of the Eastern Pennsylvania Association reported that a new arrangement should be entered into with reference to the employment of a service and traffic engineer to bring about better results than at present exist.

Resolutions were adopted protesting against further legislation imposing additional taxation upon telephone companies. The resolution states that the companies are now required to pay:

To the state: Tax on every dollar of gross receipts. Tax on all securities, stock and bonds. Bonus tax on every share of stock issued. Stamp tax on every share of stock transferred.

To the federal government: Tax on capital stock issued. Tax on every message of 15 cents and over. Tax on net earnings. Tax on our bonded indebtedness. Tax on capital stock transferred.

Bell Earnings for Seven Months Show Increase.

The earnings of the entire Bell system for the seven months ended July 31, 1916, show an increase over the corresponding period of last year. The total operating revenues amounted to $149,393,318, an increase of $15,473,972 over the previous year, while the total operating expenses were $98,531,412, an increase of $9,330,390 over the corresponding period of last year. The net earnings for the seven months amounted to $41,717,620, a gain of $5,512,443 above the same months of 1915.

The exchange revenues for the month of July amounted to $15,635,564, a gain of $1,665,150 over July, 1915. The toll revenues were $5,982,595, an increase of $706,271 over last July. Miscellaneous revenues totaled $274,768, making the total operating revenues for July $21,892,927, a gain of $2,444,290 over July, 1915.

At the close of July the Bell system owned 19,122,921 miles of wire, an increase of 1,177,390 miles over the corresponding period of last year, and had a total of 9,549,634 stations (including connecting stations), an increase of 665,892.

Electrical League of Cleveland Opens New Quarters.

The Electrical League of Cleveland, Ohio, last week celebrated the formal opening of its unique quarters on the roof of the Statler Hotel, 15 stories above the street. The directors and officers of the organization are: N. H. Boynton, president; J. T. Kermode, vice-president; H. O. Leinard, treasurer; R. S. Dunning, secretary; Norman Anderson, J. M. Bateman, H. J. Davies, Mathias Turner, G. S. Milner, H. C. Turnock, M. H. Moffett, F. R. DuGuay, H. L. Schneider, M. G. Buchan, H. S. Greene and H. B. Dates.

New Membership Record of Texas Association.

The Texas Independent Telephone Association added 49 new members during the month of August, according to Secretary E. C. Blomeyer. The association's membership list, he states, is now the largest it has ever been in the association's history.

New Toll Line Completed between Superior and Borea, Wis.

The People's Telephone Co., of Superior, Wis., has completed a new toll line from Superior to Borea. From Borea it goes across the county to Dewey.

Do Not Delay!

Heeding an Opportunity—Our Right to Proper Income

By J. C. Kelsey

Once in the history of the world the supply ran ahead of the demand. That was in the middle nineties, when the entire world seemed surfeited. Farmers were glad to sell corn at 12 cents per bushel and the country schoolhouses found it cheaper to burn corn on the cob than to buy coal and haul it from town. The farmer's wife was glad to get 15 cents for a chicken, and the eggs were a drug on the market.

A good horse would bring a few dollars if the seller threw in a halter. A good cow might sell for $30, and the common price for a calf was $3. A 300-pound hog sometimes sold as high as $9, and everything in the world seemed to have a corresponding value.

The butcher gave liver away, and in generous moments threw in a flank steak for good measure. The harness maker was glad to get $30 for a set of heavy harness, and the dry goods man could put dresses on a whole family of girls for a few dollars. Never in the world did a dollar go so far in its purchasing power.

Today it costs 90 cents to put a bushel of corn in the feed box, and the country schoolhbuse is glad to haul coal all the way from the town, even if it has doubled in price.

In the middle nineties, a ton of soft coal was delivered at $2.50 per ton, while today it costs nearer $6 for a poorer quality. It costs $1 to place a good-sized chicken on your table, while your breakfast eggs range somewhere between 30 and 60 cents per dozen.

A good horse does not need a halter thrown in to give the value, and the price of a cow staggers the imagination. A 300-pound hog will put $30 in the owner's pocket, and the butcher puts his liver and flank steak in a safety deposit vault.

The harness maker gets $40 for his heavy harness, and the dry goods man has put such a price on dress goods that men have been tempted to drown girl babies at birth.

Never in the world has a dollar been so paralyzed in movement. George Washington, who could throw a dollar across the Potomac River 150 years ago, could not toss it across Bear Creek under today's conditions.

Back in those days when supply grew far beyond demand, the telephone was born to the world as a free agent. When the butcher gave away flank steak, the telephone man was justified in his $2 and $1 telephone. It was about all that the butcher, grocer, dry goods man, and druggist could afford to pay to put a telephone in the store and the house simultaneously.

Indeed $36 a year was quite a respectable sum of money to pay for a service which had been denied to the human race for its thousands of years. The telephone man was fair and he charged for telephone service all that the traffic could reasonably bear.

Today, telephone service still stands at $2 and $1—sometimes $1.50 and $1. Why the miracle of this stationary price? Do not telephone men know that everything has gone up?

Do the directors, themselves, lawyers, grocers, editors, and men of activities, still believe that the schoolhouse is burning corn in preference to coal? Is there anything in the company's charter which says that a rate once given, is always given regardless of the fluctuation of supply and demand?

Is there any reason at all why a great industry should stand in such splendid isolation? Alone in its glory, it sticks to the muzzle loader, and exchanges its products for wampum, just as the simple Indian did in generations past.

Telephone service has only stuck to the muzzleloader as far as its public charges go. It has increased its subscription list to gigantic proportions and it has kept pace with the mechanical requirements of the situation.

Unlike other activities, it has increased its relative expenses with its growth—and its growth will never stop until every household and office shall have its service.

Regardless of prosperity or adversity, the telephone business grows. Strange to say, the telephone business seems to be in a peculiar situation of being much better off in hard times than what we term good times—for some.

A double crime is admitted. Telephone service at $2 and $1 in the days of free meat and cheap corn was also a fair price at a time because it served 100 subscribers.

Even assuming that free-meat days and cheap-corn seasons had kept up, it is not difficult to see that telephone rates should have kept pace with the increasing expense of an increasing subscription list. It would have been wrong even to have maintained $2 and $1 rates, if the 300-pound hogs were still selling for $9.

Does any telephone man, true to himself and his stockholders, cheerfully come forward to say that the company's condition is nearly as satisfactory with 1,000 subscribers as it was with 100 or 200? Has the net income, in proportion to investment, held its own as the company progressed from 200 to 1,000? It is a safe bet that it has not.

On top of the double crime of stationary rates, in spite of increasing subscription lists and increasing costs of living, another condition hangs over the public service company: Public authority has stepped into the ring and claims control of all rates charged by public service companies.

Each state authorized and appointed a board of public utility commissioners to investigate such complaints as may arise between the company and the public which it serves. Time has demonstrated that public utility commissioners are human, if the proper information is placed at their disposal.

Commissioners are not inquisitors nor instruments of punishment—they are really referees. Sometimes they overstep authority, and sometimes want to be re-appointed or re-elected. At such times the public side of everything may be a frenzy on their part. But all in all, the fault of omission on the $2 and $1 question is up to the telephone company and not to the law.

Every man knows, or should know, the difference in our feelings whether or not we have a dollar in our pocket. There is nothing so hopeless and helpless as the man without a coin in his pocket. There is nothing so cocksure and confident as a man who is conscious of money in his pocket, and more coming from the same source.

The same thing is true of a corporation—whether it be

a bank, grocery, manufacturing company, or operating telephone company. If the company is not making money, no one has any interest in it or in the industry, and courage particularly is absent. If it is a big money maker and each meeting suspicions a dividend, everyone connected with it will be wildly interested in the company as well as the whole industry.

We have known for years how difficult it is to run a telephone association. We have known how hard it is to get a telephone company to renew its subscription to the trade paper, exclusively devoted to the success of the industry. We know how a few companies contribute to its national association, whose representatives are on its firing line.

We know that there is a strange lack of interest in a gigantic business, and I think I know the reason why. The telephone company, maintaining the rates of two decades ago, is finding it too difficult to meet the increasing charge factors of its business. In other words, a lack of interest or enthusiasm is caused by a worry over the condition of the company's treasury.

Put some money into the telephone company's pocket, and it won't be long before it will tend to burn a hole, just as it does in the individual's pocket.

The first thing you will do is to become again interested in the industry as a whole. You will find out when the next convention takes place, and you will be there. You will hunt up the treasurer and ask how much you owe or should give, and then you will subscribe for all the trade papers.

With money in the treasury, your heart would expand, and you would go on the floor of the convention and give everyone a message of hope and cheer. Profit is the best medicine that any industry can take regularly.

Putting money in the company's pocket is really very simple. How many telephone companies would stand at the head of the success class if they could raise their business rates by 50 cents and their residence rates a simple quarter per month?

An average raise of $4 per year for your 1,000 or 1,200 or even 5,000 and 3,000 telephones would put you on easy and comfortable street. It is not meant that such a small raise would give us beds of ease but it certainly would convert loss to profit, red ink to black, pessimism to optimism, and make life more worth while.

Suppose our 5,000,000 Independent telephones had an average increase of $4 per station per year. We would become a veritable beehive of enthusiasm and energy.

Strange to say, all this achievement is possible, and entirely dependent upon ourselves. If we are to be content with present conditions and satisfied to be borne along by the current of passing time, we possibly can finish our lives with the industry.

If things in this life were so arranged that misfortunes would come singly, we could take the risk easily. But contentment with your present lot means a decay not only of your own power, but of associations, trade papers and factories. The patient, instead of having appendicitis, would be found to be filled with cancers and all the surgeon can do is to sew him up and see if he will live.

The law means: "The right to limit a corporation to a fair return fixed by public authority, involves the correlative *right in the corporation to be assured of a fair return* during *all* the *time* that its *capital* is *employed* in public service."

This means that every telephone company not only has the right to a reasonable profit at the present time but a chance to recover losses which have occurred in the past by reason of insufficient rate. It does not matter whether it was due to ignorance or wrong belief or any other cause, the company has a right not only to a reasonable return on its investment but, in addition, a restoration of its impaired capital.

The community in which a telephone company operates cannot get away. It has used the telephone service for years. Through some inadvertence it failed to pay high enough rates, and the capital of the company accordingly became impaired.

It owes the company every dollar of this impaired capital and cannot escape its payment, if the company makes the effort to collect it. But the managements of so many companies are afraid to face any trouble with their subscribers, who in turn have raised prices on every walk of life. No telephone company which gives service to doctors, lawyers, butchers, druggists, stores and mechanics should have any cause to blush for shame in asserting its rights.

"Your company must receive *sufficient gross revenue* to pay all *operating expenses,* including a proper provision for depreciation and yield such net revenue as will pay to the owners who provided the existing plant adequate compensation for the use of their money, and so establish the credit of the company that it will be enabled, by the sale of its securities, to secure the money needed each and every year for the extensions and additions to property necessary to meet the demands of the public for increased service.

A telephone plant, so long as it is operated as a going concern, is never and can never be a finished or completed property. At all times there is a demand from the public as individuals and as communities for additional service. The patrons of the company's exchange service are constantly changing, new patrons being added and old patrons discontinuing their service.

The experience of the company has been that, to secure a net increase of one exchange station, it is necessary to add three. It was shown that while we have 2,900 stations at X, the company had at one time or another installed 9,000 stations and discontinued 6,000."

I could go on indefinitely showing you the way to financial independence and pride in a great industry. While I know it is troublesome to undertake an assertion of your rights, it has never given the private tradesmen of your company any trouble or tinge of conscience to raise their prices.

We surely have no reason to thank God, as had the Pharisee, that we are not like other men. Surely we do not want to be known as industrial Pharisees. Let us be a part and parcel of the living, hoping and breathing world. It is easy if we but start.

MORAL: The easiest way has economic as well as moral penalties.

Telephones Being Installed at Kentucky Fair Grounds.

The Louisville (Ky.) Home Telephone & Telegraph Co. and the Cumberland Telephone & Telegraph Co. have been making their usual preparations for the State Fair by installing temporary stations, most of them pay stations in the state fairgrounds which are several miles southwest of the central offices of the companies.

Practical Subjects—Letters and Discussions

Inventory Men! Make a Note of This.*

By W. F. Schregardus.

Chccccccchcchcchcccccvbbvccccchhhcccc.

This is a code—but it is not an institution to smite the enemy hip and thigh or shoot him on the spot. It constitutes a field inventory of a portion of a toll lead taken on a portable typewriter from a moving train or automobile, each letter representing a particular item of plant. With a few general notes covering the kind of pole used in the lead and the uniform number of cross arms on each pole, a complete inventory can be recorded rapidly, legibly and in a very small space.

On the key designations of the portable typewriter (standard keyboard) are placed in red ink the code to be used, leaving the original designations in place. For convenience only, the letters not requiring key shift are used.

The lower rank of keys is used for the class of items most frequently met—poles—each key representing a particular height of pole, thus the small letter *z* stands for a 20-ft. pole, *x* 22-ft., *c* 25-ft., *v* 30-ft., *b* 35-ft. and so on.

The next rank represents arms and miscellaneous items—*a* stands for a 12-pin arm, *s* 10-pin, *d* 8-pin, *f* 6-pin, *g* 4-pin; *h* stands for anchors with 6,000-lb. guys, *j* for line guys, *k* for push braces. The upper rank can be used for any other items of plant, the code being arranged as convenient.

The method of using the typewriter in taking an inventory of a toll lead is very simple. Its accuracy depends upon the experience of the operator in judging heights of poles, as would be the case in practically any inventory taken, for individual poles are seldom measured. It further requires some proficiency in the use of the machine. However, regardless of the roughness of the road the operator will make a legible record if he is able to strike the keys at all, and longhand notes on any moving conveyance are practically out of question. Below is a description of the use of the system and the character of the work it is adapted to.

Toll lines in level countries are fairly easy to inventory on account of the uniformity of most of the characteristics of toll leads. First, between adjacent junction points or exchanges they consist of a certain kind and minimum height of poles, the height depending on the number of cross arms which the lead was designed to carry, and only occasional poles to clear roadways or obstructions are higher than the regular height of the lead.

Having indicated once the kind of pole—white cedar, chestnut or creosoted pine—it is only necessary to press the *c* key for each 25-ft. pole passed by the operator, and the keys to the right for any other height encountered. No spacing between letters is necessary as the record is legible without spacing.

The number and size of arms on long sections of toll leads are uniform and a single statement can be made at the start to indicate how many arms and what size there are on each pole in the lead. If at the end of a section the number of arms increases in order to carry exchange wires, only the additional arms need to be shown on the detail record.

The toll wires are uniform throughout from junction pole to junction pole, or exchange to exchange, and need be recorded only once for each section of lead, using the regular characters of the typewriter for this purpose, and for any other notes such as indicating railroad stations. A separate wire map showing circuit information including transposition brackets and loading equipment is more satisfactory for assembling data concerning toll wires. If this is done no record need be made on the typewriter of the wire plant.

A typical inventory of a portion of a lead on this basis would be as follows, assuming that the toll wire information is covered on a separate wire map, and using the code outlined in a previous paragraph.

On H. & T. C. R. R. from U. G. pole Dallas to Lancaster Jct. pole.

W. C. poles, class B.

3 10-pin fir arms except where extra arms are noted.

chhacacacacfcfcfvfbfbfvccccchhhhccc.

This is a representation of a 25-ft. lead carrying one arm for exchange wires for a distance in addition to the arms for toll wires, and four higher poles are included for a public road crossing.

The advantage of this system is that a legible printed record can be made on a moving train or automobile on which legible long-hand notes would be hardly possible, even if the operator were rapid enough to secure the necessary information. As there is only one key to press for each pole, it can be done very rapidly, providing the inventory data is for any but the most exacting purposes.

In the state of Texas, with its fairly level territory and with most of its thousands of miles of toll leads on or along railroad rights of way, it can readily be seen that profitable use may be made of this system.

One of the main savings is the time required to secure the information, for walking is slow and riding other conveyances than trains on railroad tracks not permissible. The system can also be extended to inspection of toll leads for broken glass, leaning poles, etc. It would be especially suited to the inventory of the pole plant of telegraph companies occupying railroad rights of way throughout their entire plant.

*Southwestern Telephone News.

Telephony's Home Course for Telephone Men.

(Not meant for study.)

By Well Clay.

To those who wear no ball nor chain,
But walk untrammeled, free,
Is given not to measure full
The joys of liberty.

Do you get that? Imagine for a moment whether you boys, who have to ride the lines day after day—trimming trees, changing batteries, pulling slack, replacing glass, and the thousand and then another thousand things which are part of the routine—are enjoying the fresh air, the good roads over which you spin in your automobiles on your way to and from your work, the hail-fellow well met comradeship of every patron along the line, the good dinners of which you very reluctantly partake when pressed strongly enough, and the experience, as much as would a man who had just been released from a long confinement in bed or jail or some other pleasant place like that.

Do you appreciate your luck in being able to spin along at a rate of 25 or more miles per hour—riding on soft cushions, with nothing to do but hold the steering wheel and step on the ambition button of the car? You who have never traveled swiftly over the country behind an ox team at the rate of four furlongs per hour and had to handle a different kind of a wheel, on hills and in mud holes (and there were many of the latter) can really get an idea of the snap you are having in these modern days.

Still one did not ride so much in the olden times because, for one reason, the roads were so rough, that it took an average man all the time to hold on, and was too hard on the system. Then, too, when one has to hop out every few rods and grab the spokes to a wheel and pull with all his might to help extricate the vehicle, he gets too tired to ride. You boys spin out, after supper perhaps, farther, to take a short circuit off a line on five minutes' notice, than a man in those days would think of

going in a day; and at that he would have to have notice some days before so he could get ready to start at daybreak.

On the other hand, do you think the boys you see loafing day after day in the park or up and down the street are enjoying themselves and their leisure as much as you, who have to work every day, would, if you could get a day and your mind off your work for once?

Perhaps you are stringing wires along the street on a hot day, and, as you take the wire from the reel and, pulling it over your shoulder, plod wearily along and up and down each pole until you come to the end of the lead, while the perspiration traces a network of lines on your back like the nervous system of a frog, you see the fellows, who do not feel called upon to work, as they loll restfully on the grass of the public square. Do you for a moment think that they are experiencing the same feelings of relaxation that you would if you could trade places with them for half an hour?

No one could doubt the feelings of bitterness which a member of a chain gang, dragging a nice large chunk of iron attached to his leg (to avoid skidding perhaps) would have at the sight of a man walking along free of all detaining jewelry. He would feel that the free man, in all probability, would not be appreciative enough of his great blessing—and he would be right.

Those who are the most free to worship at any shrine they wish, without fear of persecution or condemnation, sometimes do not worship at all. It is human nature to want to do something that some other human being has told you not to or tried to fix you so you couldn't. That is one of the forces that makes for advancement and one of the most helpful ones which pushed the telephone game along so fast.

The reason why we do not advance faster, personally, in putting into operation some of our many ideas, is because no one has forbid us to. We are free—so free that we stand still and vegetate. By comparison with the boys of the "rest association" we who have to labor every day are tied, but judged by the old time standards, we are enjoying a mighty lot of freedom—almost as much as a bird on the wing, as it might seem to people of long ago.

It all depends on which way we look at it. We are getting so accomplished and smart in this day and age from constant handling of miraculous things and forces that we are beginning to think we are some pumpkins. And sometimes, when we get to day-dreaming, we imagine the power we would soon yield were we to be carried back a few hundred years into the past and placed among the simple old timers. With our superior knowledge of the arts and sciences we would soon make them sit up and take notice. That is, unless they asked us to prove some of the few marvelous things about which we might tell them. Then, most of us would really have to take a back seat.

We who have been so used to living among marvels like the automobile, the phonograph, the telephone, the flying machine, and the thousand and one other things which surround and make life pleasant for us, might have to hesitate a little in explaining to a bunch of simple-minded prehistoric rubes just how they were made, or, to make any one or any part of any one of all the array of modern machines which are so familiar to us, ourselves. And we surely would have to make one, and make it work, before anyone would believe what we were saying.

Could you who ride on rubber tires every day tell just how to make a rubber tire? Could you make one at all if you were where there was nothing ready to work with like rubber, wire, twisted cord, vulcanizers, web for the tread, and a few other necessary things? Could you make an engine or supply it with gasoline? Could you make a phonograph if you were marooned in a gloomy forest with nothing that you needed for the machine except the time to work on it? Could you make a piece of iron or steel?

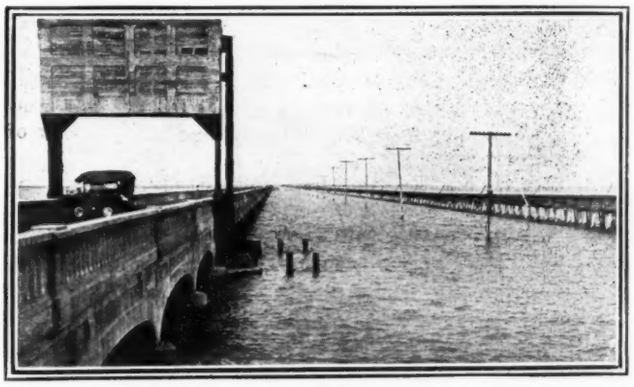
You might have trouble in making good, even with all your supposed practical knowledge. And even if you did make good, the chances are that you would be burned as a witch or something like that.

It is much better, therefore, that you and I are living right here in this century where we are among friends and know the run of things, even if we do have to listen tomorrow for the ten thousandth time to the same old mess of "bunk" from people whose telephones are out of order. We have as much fun as we are entitled to and we are not nearly as bad off as our forefathers were a few hundred years ago, if we take the proper view of things. It is a good thing to be tied down sometimes; otherwise, we would never appreciate the taste of freedom.

APHORISM: A wrong focus spoils the best of pictures.

Protection of Telephone Line Across Corpus Christi Bay.

Thin copper sheathing around the butts of telephone poles set in salt water, has preserved a telephone line across Corpus Christi Bay against the ravages of toreados, a salt-water boring organism that is very destructive of wood, for many years. The line was built in 1899, before creosoted poles became widely used in the South. It connects the city of Corpus Christi, Texas, with the mainland, running about three miles in shallow salt water across Corpus



Telephone Line Across Corpus Christi Bay.

Christi Bay, an indentation of the Gulf of Mexico. The butts of the poles to the top of the water were sheathed with thin copper plates.

The telephone line from Corpus Christi to Sinton, a town on the mainland, was reconstructed in 1916, but it was found that the line across the bay was in such good condition that it was left standing. A portion of this line was destroyed, however, in the tropical storm in August, 1916, that damaged Corpus Christi seriously and put all wire lines into the city out of service. The railroad trestle and causeway shown in the accompanying illustration were both partly destroyed in this storm.

The Use of Hand Sets for Operators.

P. J. Weirich, general manager of the United Telephone Co., Monroe, Wis., has tried out the use of hand telephones in his exchanges and found them very convenient. Hand sets equipped with a switchboard operator's plug and jack are used by the night operators. Mr. Weirich states that this makes a very convenient night operator's set.

"Telephony's" Home Study Course for Telephone Men

A Complete Presentation of the Principles Underlying Modern Telephony in All Its Branches—Arranged Systematically So That Regular Reading and Faithful Study Will Qualify Ambitious Men for Higher Positions—Prepared Under Supervision of Stanley R. Edwards—This Section Written by Jay G. Mitchell

Quiz Questions on the Preceding Installment.

473. What makes the telephone relay necessary for satisfactory transmission over the longest circuits?

474. What principle is embodied in the operation of the telegraph repeater?

475. Along what line has the entire development of the telephone relay proceeded until recently?

476. Why is it advisable that the telephone relay have no moving mechanical parts?

477. Describe the operation of the microphone type of telephone relay.

478. Outline the principle of operation of the vacuum tube telephone relay.

479. What are the essentials of a successful telephone relay?

[AUTHOR'S NOTE: A very interesting and complete study of the principles underlying the operation of the vacuum tube repeater is contained in the article by Irving Langmuir, entitled "The Pure Electron Discharge and Its Radio Applications." This appeared in TELEPHONY of February 12 and 19, 1916.]

Some Queries on "Telephony's" Home Study Course.

In TELEPHONY of August 19th, in Fig. 162 of TELEPHONY'S Home Study Course I noticed what seems to me an error. The condenser is placed so as to allow battery from the line to pass through the operator's receiver. Is this correct?

In regard to Fig. 160, is this an old circuit, or is it one of the latest?

I have noticed that relays of different resistance will operate on different amounts of current; one of 9.5 ohms will operate on 0.1 ampere, while another design having 9.4 ohms' resistance will take only 0.01 ampere to operate it. Is this due to the difference in the weight of the armature or in the difference in the design of the relay?

In Fig. 162 the object is to illustrate the fact that, for the average subscriber's circuit, the operator's telephone receiver is connected, so far as the alternating voice-carrying currents are concerned, between points of equal potential. Through an oversight in checking the drawing, the left-hand terminal of the receiver was shown connected to the wrong side of the condenser. The left-hand terminal of the head receiver should be connected to the point, 5, as it is now shown in Fig. 162. This conforms to the circuit arrangement shown in Fig. 161, and prevents the flow of direct current through the receiver winding.

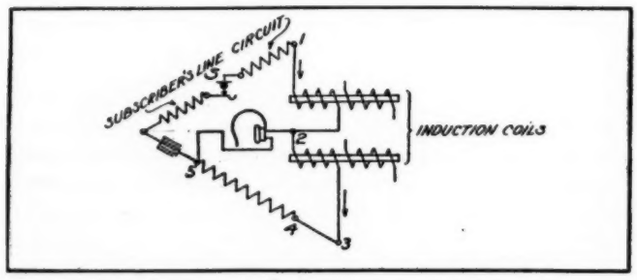


Fig. 162. Operator's Side Tone Circuit Conditions.

The arrangement of the operator's set wiring, shown in Fig. 160, is the one used by one of the older telephone manufacturers. The principle involved is not new.

As a measure of value, the resistances of telephone relay windings mean nothing. The resistance is determined by the winding space and size of wire used, while the magnetic pull depends directly upon the ampere turns. The ampere turns is the product of the amperes flowing through the winding and the number of turns. For a review of this entire subject see TELEPHONY'S Home Study Course for Telephone Men, sections 73 to 76, inclusive, and sections 260 to 293, inclusive.

PRACTICAL TALKS JUST AMONG OURSELVES.

The Fosterburg wire chief, by watching every detail, succeeded in raising the quality of service in Fosterburg and Smithville to a point where it was very satisfactory to the public. It had been necessary to rebuild the toll lines between the two offices and to re-wire and overhaul the small magneto switchboard at Smithville.

Since all the telephones at Smithville were of the local battery type, the Fosterville wire chief had insisted that the local man periodically inspect each one. During inspection the transmitter batteries were tested for voltage and current output on short circuit, the receiver cord was tested for cut-outs, and the generator bearings were examined to make sure that they were properly oiled.

In a very few months, by this method, the entire Smithville plant, like the Fosterburg exchange, was placed in such excellent condition that trouble reports from the subscribers were very unusual. Not only was the amount of trouble reduced, but the service was tremendously improved, and the whole-hearted support of the public assured.

The rebuilding of the old toll lines between the two offices stimulated the toll traffic, not only between Smithville and Fosterburg, but also between Smithville, through the Fosterburg office, to more distant points. The two new circuits between the two offices were so carefully built that when the traffic grew so heavy that they were unable to handle it a phantom circuit was installed. This involved very slight expense for equipment and the work of making the necessary transpositions.

By this plan the number of commercial telephone cir-

cuits between Smithville and Fosterburg was increased 50 per cent. with almost no increase in the plant investment. The phantom afforded a much better circuit, owing to its low resistance, than either of the original physical circuits. For the first time the wire chief was able to demonstrate to the general manager that the purchase and rehabilitation of the Smithville exchange was a profitable and wise move.

Very soon after the completion and inauguration of the phantom circuit between Fosterburg and Smithville, large quantities of shale suitable for the manufacture of very expensive brick, were found almost within the village limits of Smithville. Owing to the scarcity of this kind of raw material, an enormous brickyard was started there, and immediately preparations were set on foot to organize the necessary working force and to provide for their homes in Smithville. The resulting boom required an immediate enlargement of the telephone switchboard and the employment of an additional operator. The business of the brick company also increased the amount of long distance traffic between Smithville and outside points.

Since the Fosterburg wire chief had kept the lines in good condition, as far as the county line, he felt reasonably sure of the ability of his company to give satisfactory long distance service to such points as were reached by toll connections. The equipment itself was in the very best of condition, owing to the careful methods of inspection and maintenance, and trouble was, in most cases, removed before the public became aware of its existence. All the outside cable in Fosterburg was in excellent condition, due to care in selecting and installing protective equipment.

When the brick company at Smithville began to complain of unsatisfactory transmission over the long distance lines, it was a most disagreeable surprise. The wire chief was at a loss to account for it, and the circuits were tested repeatedly without developing the cause of the poor service. Every inch of wire in the toll position at Fosterburg and every key contact, soldered connection, cord and plug were gone over with no result.

There was no possible doubt, however, as to the difficulty experienced by the brick company's office in talking from Smithville to some of the more distant points. Owing to the limited distance, the transmission between Fosterburg and Smithville had always been fairly satisfactory to the local business men. But the changed conditions and longer radius of communication demanded immediate attention, if the company was to retain this very profitable business.

Since the wire chief was a faithful reader of TELEPHONY'S Home Study Course for Telephone Men, he began to suspect that undue transmission losses were present in the toll plant. Careful consideration and search failed to indicate the places where such conditions were possible. As the matter continued to give rise to numerous complaints, he decided to have the toll circuits and switchboard equipment tested for transmission losses. The results of the tests indicated unquestionably that the complaints of the brick company were justified.

Not only was the transmission loss between Smithville and the point to which the brick company talked most frequently, far in excess of the ordinary limit for commercial circuits, 35 miles, but the transmission loss between the manager's office and that of the manager in Fosterburg was unduly high. It was found that the transmission loss through each of the cord circuits of the Smithville switchboard was 1.25 miles of standard cable. The transmission engineer making the measurements stated that a loss of not more than 0.1 mile of standard cable in the type of cord circuit in use in Smithville was allowable.

The protectors at Fosterburg were so wired that the heat coils were included in the talking circuit. They were immediately rewired so that the heat coils were included in the circuit between the jack and the drop. The insertion of a plug in the jack completed the connection direct to the line without carrying the circuit through the heat coils, while the line was being used for conversation. As they were originally installed, each heat coil introduced a transmission loss of about 0.2 mile of standard cable.

The repeating coils used in equipping the phantom circuit between Smithville and Fosterville were of an old type taken from stock. It was found that there was a transmission loss in each of the physical cirrcuits, due to these obsolete repeating coils, of 4.5 miles of standard cable. In the same way these coils introduced a transmission loss of three miles of standard cable into the phantom circuit. Coils were ordered for rush delivery, that would reduce these losses, due to the repeating coils in the circuits, 80 per cent.

It had been a matter of pride for the wire chief to use the same type of switchboard cords on both the local and toll positions at Fosterburg. While these cords were perfectly suitable for use on the local positions, a change on the toll position reduced the transmission loss in the toll cord circuits to a remarkable extent.

The operator at Smithville was found to be using the repeating coil of the cord circuits on all connections involving a toll circuit. This practice was a relic of the old days at Smithville, when some of the local lines and some of the toll circuits were of the grounded type, requiring the use of a cord equipped with a repeating coil, to assure any sort of quiet transmission between the grounded circuits and the few metallic circuits. The repeating coils in the cord circuits at Smithville were of an old and obsolete design, and in themselves introduced the extremely high transmission loss of 3.5 miles of standard cable. Orders were at once given by the wire chief that these inefficient repeating coils should be replaced with more efficient ones of modern design, and that they be used only when conversation was found to be impossible without them.

In Smithville the local man had experienced trouble with the drop of one of the Fosterburg lines. Since repairs were difficult to make he had permanently bridged an extension bell across the circuit. It was found that this extension bell had a low impedance, and as it was connected across the circuit at all times, produced a very serious transmission loss. The defective drop was at once replaced and the extension bell removed. Since the switchboard circuit was of the standard type, the drop was also disconnected whenever a plug was inserted in the line jack.

It was found that the operator at Smithville, through ignorance of the effect produced, was keeping the listening key cam thrown on all long distance connections. After some difficulty this fact was established beyond doubt, and the operator was shown the injurious effect upon the company's business such a practice was bound to have.

When the changes recommended by the wire chief were made, the increase in long distance business and the reduction in the number of complaints surprised the entire force.

CHAPTER XXI. Telephone Circuit Efficiency (Concl'd).

480. *Nature of loss-causing effect.* Should it be found possible to pass the alternating voice-carrying currents through a circuit having resistance only and being absolutely free from capacity and inductance, they would be affected only by the drop in voltage due to the resistance. The drop in voltage would have the effect of causing the currents in the circuit to be weaker than would be the case if they were not passing through the resistance.

Such a circuit is impossible, owing to the commercial standards of construction and materials available. With the introduction of electrostatic capacity, one component of the line current is caused to lead the impressed electromotive force 90 degrees. Inductance, as has been shown, has precisely the opposite effect. The joint effect of the capacity reactance and the inductance reactance is the introduction of changes in the wave form of the alternating voice-carrying current.

As the alternating voice-carrying current wave form is changed from the form it would have if flowing in a theoretical circuit free from capacity, inductance, and leakage—having resistance only—it is said to be distorted. The effect of any given telephone circuit on the alternating voice-carrying currents, in addition to the effect ascribable solely to the circuit resistance, is summed up in the term "distortion." The effect of *all* line conditions, including distortion, is known as attenuation. The greater the factor of attenuation, the greater the loss in transmission.

It must be understood that the effect of circuit conditions can never change the *frequency* of the line currents. The currents of certain frequencies are more seriously damped than others and the actual amount of power transmitted is seriously affected.

Theoretically, perfect loading would preserve the wave form and the perfect telephone relay or repeater would add energy to the circuit in the same form as the reproduction of the original tones impressed on the transmitter diaphragm at the sending station might require.

(To be Continued.)

Convention of Indiana Independents at Indianapolis.

The Indiana Independent Telephone Association held its tenth annual convention at the Claypool Hotel, Indianapolis, Ind., on Thursday and Friday of this week, September 14 and 15. An interesting program as carried out, addresses being made by President H. F. Farwell, J. L. Clark, of the Indiana Public Service Commission, H. L. Cook, secretary of state and chairman of the state board of tax commissioners, F. B. MacKinnon, of Washington, D. C., E. B. Fisher, of Grand Rapids, Mich., LeRoy Parker, of Columbus, Ohio, and others.

In conjunction with the convention a two-day operators' school was held for the operators of the member companies of the Indiana association. This school was in charge of W. S. Vivian, of Chicago, and F. V. Newman, of Grand Rapids.

Owing to the fact that the convention was in session as TELEPHONY was put to press, it was impossible to obtain a report of the convention for publication in this issue. However, a complete report will be included in our next issue, that of September 23.

Telephone Installations in Chicago City Departments.

Commissioner of Gas and Electricity Keith, of Chicago, has notified the Chicago Telephone Co. to reinstall all wiring for telephones, intercommunicating systems and P. B. X.'s furnished the city departments in conduits, metal molding or in asbestos insulated wires and the equipment located under stipulated conditions as regards fire and liability risks. This is one result of his investigations as to the present methods of making telephone installations.

Proceedings Before Commissions, Courts and Councils

Discussions and Rulings of State Bodies Having Supervision Over Telephone Companies, Decisions of Courts in Matters of Interest to Public Utilities and Actions of City Councils Relative to Franchises, Rates and Service

Important Ruling on High Tension Interference in Iowa.

The Iowa Railroad Commission, on September 5, handed down an important ruling to the effect that telephone lines now in operation on the public highways of the state have a priority right over transmission lines which may be constructed in the future. This decision, it is stated, affects more than 5,000 grounded rural telephone lines in the state, many of which have encountered considerable trouble by the construction of high tension transmission lines in close proximity.

The commission handed down this ruling in granting a franchise to the Peterson Power & Milling Co. to construct a transmission line in Buena Vista county. It provides that the Peterson company may build its line, but that it must pay whatever expense is necessary to rebuild telephone lines along the route of the transmission line with which the high tension interferes.

This ruling is a result of an investigation made by the railroad commission last spring. In connection with this investigation hearings were held at which all the telephone companies in the state were requested to be represented.

Government Denies Approval of Chicago Automatic.

The Chicago newspapers report that the United States Department of Justice has declined to guarantee the Chicago Telephone Co. that it would not be violating the federal anti-trust laws if it absorbed the automatic telephone properties of the Chicago Tunnel Co. The telephone company's recent request for a ruling, it is stated, was returned with word that no ruling on the proposal would be made in advance, officials practically admitting if a merger is made it will be taken to the courts.

Mayor Thompson of Chicago has denied the report circulated in the press that the ordinance providing for the

sale of the automatic telephone system of the Chicago Tunnel Co. to the Chicago Telephone Co. became void on September 10. The mayor states that, according to an opinion from Corporation Counsel Folsom, no ordinance becomes a law until after he has signed it. The ordinance permitting the sale of the automatic plant was signed by the mayor on March 21 and therefore does not become void until September 21, if the conditions are not fulfilled.

Contributory Negligence of Lineman.

A lineman of a telephone company, who had enjoyed several months' experience in its service in that capacity, aged about 20 years, and not lacking in intelligence, was injured by contact with electric light wires belonging to a municipality, which had been strung on poles in close proximity to the poles of the telephone company, and from which the insulation had been apparently worn off near the telephone pole which the lineman climbed, as appears from his testimony and other testimony in his behalf. The court held that the lineman knowing, or being able to know by ordinary diligence, that the wires were so exposed, was not entitled to recover from the municipality on account of such injuries. Columbus Railroad Co. vs. Dorsey, 119 Georgia 363, 46 Southeastern, 635; Dorsey vs. Columbus Railroad Co., 121 Georgia 697, 49 Southeastern, 698.

From the testimony of the plaintiff himself, the opinion of the court states, it is manifest that he failed to exercise ordinary care to prevent the injury resulting from the improper insulation of the electric lighting wires, notwithstanding he had sufficient knowledge of the danger to be expected from the contact with them, and his own admission that he had been warned by his employer to "look out" for worn insulation, and other testimony to the effect that the defective insulation was easily apparent at the point where he was injured. Zachry vs. Mayor of Madison; Court of Appeals of Georgia; 89 Southeastern, 594.

Right to Enforce Assessments Upon Stockholders.

Judgment in favor of the plaintiff has been rendered by the circuit court at Wyocena, Wis., in the case of Daniel P. Miles against the People's Telephone Co. The controversy arose out of an attempt of the officers of the company to enforce certain assessments against the holders of common stock. Upon the refusal of these stockholders to pay these assessments, the company cut the wires, and thereupon the plaintiff brought suit.

The plaintiff contended that under his contract he could not be assessed at all; that he was to receive telephone service without charge, and that he was liable for assessments for "corporate expense only in case the actual expense of operating the telephone system exceeded the receipts, and that depreciation and interest on preferred stock could not be included under the term 'expense.'"

Mr. Miles secured a judgment of $18 for the time his line was cut. The court held that the common stockholders can not be assessed to pay interest on preferred stock and depreciation.

Buffalo Merger Approved by Chamber of Commerce.

The Chamber of Commerce of Buffalo, N. Y., at a recent meeting approved the merger of the Federal Telephone & Telegraph Co. with the New York Telephone Co. The chamber also adopted a resolution disapproving the proposal that the city undertake the operation of municipal telephone, electric light and power plants, and disapproving the proposed referendum on the merger question.

A canvass was recently made of the subscribers of both telephone companies, which showed that a large majority favor the merger.

A petition containing over 7,000 signatures was also filed with the city clerk asking for a referendum vote on the merger proposition and on the proposed municipal telephone, electric light and power plant.

Telephone War Tax Repealed.

The war tax of one cent imposed on every telephone message of 15 cents and over was repealed by Congress on September 8, effective at once.

Summary of State Commission Hearings and Rulings.

ALABAMA.

September 6: At the hearing on the complaint of the city of Birmingham, Ala., against the alleged excessive rates and discriminatory practices of the Southern Bell Telephone & Telegraph Co., both parties to the complaint were given 15 days by the commission within which to file briefs. A supplemental petition was filed by the city for permission to examine the company's books.

FLORIDA.

August 30: The commission imposed a penalty of $100 fine upon the Marianna Telephone Exchange, Marianna, Fla., for a violation of section 3 of chapter 6,525 of the laws of Florida, in that it failed to keep in good condition and repair the instrumentalities furnished by it, thereby discontinuing a service to the public it had been rendering. Order 519.

ILLINOIS.

September 14: Hearing on petition of the city of Peoria, Ill., by Richard H. Radley, corporation counsel, to compel the Central Union Telephone Co. to reduce its telephone rates to subscribers in the city of Peoria. Cross petition filed by receivers of Central Union company. Case 3,043.

INDIANA.

September: Hearing in the case of the citizens of Boswell, Ind., vs. the Boswell Telephone Co. and the Farmers' & Merchants' Co-operative Telephone Co. The plaintiffs state that the Boswell company operates telephone lines and a switchboard in the town of Boswell and that the other company operates a system in the nearby country with an exchange just outside the corporate limits.

It is set forth that because the Boswell company has refused to allow the Co-operative company to connect with its exchange the stockholders of the other company have boycotted the town and that a grave commercial situation has resulted. The citizens ask an order requiring the Boswell company to connect its lines with the Co-operative company.

IOWA.

September 5: The railroad commission ruled that telephone lines now in operation on the public highways of the state have a priority right over transmission lines which may be constructed in the future.

KANSAS.

September 12: Postponed hearing on application of the Missouri & Kansas Telephone Co. for permission to increase its rates at Wellington, Kan.

MICHIGAN.

September 6: Hearing resumed on the application of the Michigan State Telephone Co. for permission to install metered service or otherwise adjust its rates to meet an alleged necessity for greater revenue.

MINNESOTA.

September 11: Hearing in the matter of the petition of L. E. Johnson, T. A. Maher, L. A. Stude, G. W. Wakeman, and others, for telephone service in the depot of the Chicago, St. Paul, Minneapolis & Omaha Railway Co., at Brewster, Minn. M—72.

September 15: Hearing in the village hall at Walker, Minn., on the application of the Walker Telephone Co. for permission to increase its individual line residence rates from $1 to $1.50 per month and its party line residence rates from $1 to $1.25 per month. The company alleges that it has recently expended $3,000 in the converting of its local exchange from a grounded to a metallic system and for other general improvements, and in order to secure a reasonable return on the investment and furnish continuous 24-hour service, it is necessary to increase its rates, as previously stated. Case M—103.

September 28: Hearing at St. Paul in the matter of the petition of James Keenan, asking the Northwestern Telephone Exchange Co. to increase its local rates in Austin, Minn., and to cease certain discriminatory practices.

September 29: Hearing in the village hall at Cold Spring on the application of the Northwestern Telephone Exchange Co. for permission to increase its local exchange rates at Cold Spring as follows: Single line business rate, from $2.25 to $2.50; single line residence rate, from $1.25 to $1.50.

MISSOURI.

September 7: The Missouri Public Service Commission approved the sale of the property of the Fortuna Telephone Co., Fortuna, Mo., S. P. Adair, the former owner, selling the entire property to T. H. Dilse.

September 8: Application filed by the Joplin Home Telephone Co., of Joplin, Mo., for permission to increase its preferred stock from $75,000 to $300,000.

September 11: Hearing at which the Alton-Slater Water Co. will be given an opportunity to show cause why the commission's order of April 24 should not be set aside or modified by attaching such conditions thereto as shall require the company to install and operate its transmission line in such a manner as will protect the public traveling on the highway and using the telephone system of the complainant (the Gilliam Telephone Co., of Gilliam, Mo.) from injury by high voltage current.

September 18: Hearing in the matter of adopting a uniform system of accounts for telephone companies. Every telephone company in the state has been given notice that it will be expected to be present or to be represented, and to introduce any evidence necessary to assist in the promulgating of a uniform system of accounts for telephone companies. Case 937.

September 18: General conference in which representatives of all telephone companies in the state are to meet with the commission and to introduce all testimony and evidence required in the adoption of uniform rules, regulations and practices.

September 25: Hearing on application of the Home Telephone Co., of Joplin, Mo., for permission to purchase the plant of the Nevada (Mo.) Telephone Co. and the plant of the Missouri & Kansas Telephone Co., at Nevada, Mo., and to consolidate the two exchanges, and to put into effect a new rate of $3 per month for business telephones and $1.50 per month for residence telephones. Case 1,068.

NEBRASKA.

September: Petition filed by the Lincoln Telephone & Telegraph Co. for an order restraining the Blue River Power Co. from completing the construction of a transmission line between Friend and Cordoba. It is alleged in the application that the defendant has not received permission from the railway commission for the construction of a transmission line and that it is building it in violation of law. The Lincoln company alleges that it has a toll line on the highway over which the defendant company is building a power line and that the toll line will be rendered unfit for service. The complainant further alleges that it has signed no agreement, as required by law, to the construction of this transmission line.

September: The commission ordered the Chadron Telephone Co. to restore service to G. H. Hornby, the only subscriber on a telephone line 14 miles from Valentine. The company is not required to furnish service to less than five subscribers on a rural line, but as the plaintiff was willing to pay the rate for five telephones, the commission ordered that service be restored.

NEW YORK.

September: The commission has taken under consideration the leasing by the Brooklyn Rapid Transit Co., of Brooklyn, N. Y., to the New York Telephone Co., of certain of the ducts to be constructed for power cable purposes in the new tunnel under the East river to be operated by the Transit company. The telephone company asks for the right to lease eight or nine sub-ducts in each of the river tubes.

OKLAHOMA.

September 5: Application filed by patrons of the Fletcher Telephone Co., of Fletcher, Okla., for an order directing the company to improve its service, which the petitioners state is generally unsatisfactory.

WEST VIRGINIA.

September 12: Hearing on the application of the four Bell telephone companies of West Virginia for a proposed consolidation. The companies include the Consolidated Telephone Co. of West Virginia, with offices in Wheeling; the Chesapeake & Potomac Telephone Co. of West Virginia; the Central District Telephone Co. and the Chesapeake & Potomac Telephone Co. of New York. These companies have 45,000 Bell stations in West Virginia. The proposed name for the merged companies is The Chesapeake & Potomac Telephone Co. of West Virginia. Protests against the merger may be filed by any subscriber or citizens of the state.

WISCONSIN.

September: Violation of the Wisconsin non-duplication laws was alleged in the case of the Ozaukee-Washington Telephone Co. vs. the Jackson Telephone Co., recently decided by the Wisconsin Railroad Commission. It was charged that the Jackson Telephone Co. had extended its lines parallel to those of the other company in certain sections of the town of Jackson, Washington county, without giving notice to the commission.

In making the extension complained of, the Jackson company relied upon a verbal understanding between its officers and the former owners of the Freistadt exchange by the terms of which the Ozaukee company was not to give service west of Thiel's Corner in the southeast corner of section 14. The Jackson company claimed that the Ozaukee company had violated that agreement by making a certain extension in 1909, but was under the impression that the agreement made it unnecessary to give notice of its own extension which was made in 1915. It was undisputed that the failure of the Jackson company to give the statutory notice was due to this misconception. Under chapter 110 of the laws of 1913 (the non-duplication law) the extension would have been permitted upon proper notice unless the commission could have found that public convenience and necessity did not require it.

For the reasons given, the commission was unable to so find, but holds that the extension would have been authorized if notice had been given and the matter brought to a hearing in the normal way. The respondent is permitted to continue its service, but is cautioned that no agreement between connecting companies can remove the necessity for complying with the statutes.

September: The Dane County Rural Telephone Co. filed notice of a proposed extension in the town of Fitchburg, Dane county. The companies interested are the Wisconsin Telephone Co. and the Oregon Telephone Co.

September: The Poysippi Telephone Co. proposes to extend its lines in Bloomfield, Waushara county. The company interested is the Fremong Telephone Co.

September: The Wisconsin Telephone Co. was given permission to extend its lines in Leroy, Lomira, Theresa, Williamstown and Hubbard, Dodge county. The companies interested are the Theresa Union Telephone Co., the Horicon Telephone Co., the Eureka Telephone Co., the Oakfield Telephone Co., the Hubbard Telephone Co., the Steiner Telephone Co., and the Mayville Rural Telephone Co.

September: The Wisconsin Telephone Co. was given permission to extend its lines in Sumner, Jefferson county; and in Yorkville, Racine county.

September: The Wisconsin Telephone Co. filed notice of a proposed extension in Merton, Waukesha county. The companies interested are the Merton Telephone Co. and the Badger Telephone Co.

September: The commission rendered a decision in the complaint of the Town Line Telephone Co. against the Red River Telephone Co., which alleged violation of the non-duplication law. It found that public convenience and necessity did not require the extension of service by the Red River company asked by the complainant. The lines are in Shawano county, Wisconsin. The respondent company is instructed by the commission to remove at once its substation equipment on the line in question and refrain from giving local service over such line in the future. Failure to do so renders it liable to prosecution under the statute.

September: The commission issued a certificate to the Cascade Telephone Co., Cascade, Wis., granting authority to issue a note for $1,225 for the purpose of purchasing a portion of the line of the Rathbun Telephone Co.

September: The LaFayette County Telephone Co., having acquired the holdings of companies at Darlington, Shullsburg, Gratiot and Wiota, Wis., filed its schedule of rates.

September: The Newbury Telephone Co. filed an application for authority to increase rates at Newbury.

September: R. E. Lubers and others, of Babcock, filed complaint against the Babcock Telephone Co. and the Wisconsin Telephone Co. alleging failure to make connection at Babcock.

September 19: Hearing at the city hall of Hudson, Wis., in the case of the American Society of Equity vs. the St. Croix Telephone Co., et al., relative to other line charges. U—905.

September 19: Hearing on application of the Marshfield Telephone Exchange for authority to adjust and increase rates.

September 19: Hearing on application of the Osceola Farmers Mutual Telephone Co. for authority to increase rates.

September 20: Hearing on application of the August Light & Telephone Co. for authority to increase rates. U—901.

September 21: Hearing at Maiden Rock, Wis., on the application of the Maiden Rock & Esdaile Telephone Co. and the Lake Pepin Telephone Co. for authority to adjust toll rates and for an order providing for a division of toll revenue among the various companies over whose lines such messages are routed. U—961.

September 26: Hearing at Westfield, Wis., in regard to the adjustment of rates for interchange of service between the Westfield Farmers Telephone Co., the Coloma Telephone Co. and the Marquette & Adams County Telephone Co. U—967.

Ever See Our Trouble Insurance Policy?

It goes with every Chicago Telephone sold.

It binds us to pay all repair costs.

It cuts out all Trouble Expense for you.

No other telephone manufacturer offers one.

Send in the coupon for a copy.

Find out why your dollars go farther when you buy Chicago Telephones.

Chicago Telephone Supply Co.,
Elkhart, Indiana.

Gentlemen:

Freedom from Trouble Expense sounds good to me. Let me see a Trouble Insurance Policy. No obligation, of course. I'm to use my own judgment in deciding whether I want to continue paying repair expense or let you pay it.

Name .....

Address .....

Chicago Telephone prices are not being increased on account of the war. We are absorbing the increased cost of materials, not loading it upon our customers.

CHICAGO TELEPHONES SATISFY

From Factory and Salesroom

Convention: United States Independent Telephone Association, Chicago, December 5-8

Advertising Firm to Specialize in Telephone Field.

Roy D. Mock, of the advertising firm of Mock & Hardy, Chicago, announces that in the future his concern intends to specialize largely in the telephone field. Mr. Mock is by no means unknown to readers of TELEPHONY, being the author of the section on "Telephone Advertising and Publicity," of the reading course on the "Fundamental Principles of the Telephone Business," now running in TELEPHONY.

The telephone business ranks fourth in the list of industries of the United States. But in spite of the extent of its operations, it is poorly advertised. The many articles on advertising which have been published in TELEPHONY in recent years, and the warm reception they have been accorded, prove that there is indeed an awakening of the telephone men's hitherto dormant advertising sense.

There should be no doubt about the ability of men schooled by long experience in advertising matters to be able to secure better returns from advertising than those who have studied the subject but slightly. Advertising is too frequently entrusted to unskilled handling. There should be no wonderment as to why such advertising does not produce results.

The members of the firm of Mock & Hardy have a number of advertising successes to their credit, some of which are in the telephone field. They have proved to the satisfaction of several of their clients that advertising results can positively be secured for manufacturers of telephone equipment and supplies. Their method of working is unique in that they operate entirely on salary, taking full charge of the advertising affairs of a concern exactly as a high-grade advertising manager would do. By handling the advertising of a number of concerns on such a part-time basis, they are able to render to each concern a high-grade advertising service at a minimum of cost.

The offices of Mock & Hardy are located in the Harris Trust building, 111 West Monroe street, Chicago. A letter directed to them will receive personal attention, and will bring back full information regarding the services this concern is prepared to render to both manufacturing and operating telephone companies.

Standardization of Enameled Wire.

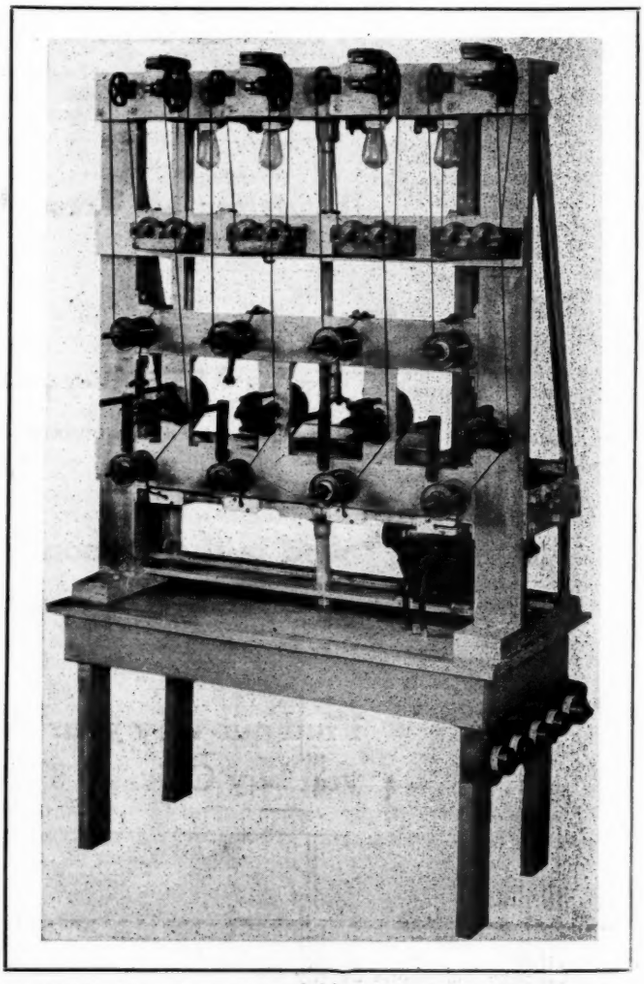
The standardization movement is now sweeping like a gigantic wave, the telephone field, just as the "Safety First" movement swept all industrial plants a few years ago. The Kellogg Switchboard & Supply Co., one of the pioneers in advancement in the telephone field, has now undertaken the standardization of another of its chief products, namely, enameled wire.

On account of the many advantages which this product possesses over the silk-insulated wire for certain classes of work, particularly in the smaller sizes, a large number of companies, it is stated, began to manufacture enameled wire without giving any thought as to uniformity of product. It is pointed out that a peculiar situation has developed from this state of affairs, in that every customer has been compelled to make his own tests on the enameled wire, developing his own methods and forming his own ideas as to what constitutes an acceptable product.

The Kellogg company has come to the conclusion that an effort should be made to further standardize the quality of enameled wire, just the same as all other Kellogg apparatus, repeating coils, and induction coils, for instance. To carry this thought to a last analysis, no induction coil or repeating coil may properly be standardized unless the materials from which the apparatus is made are uniform.

A special machine, therefore, was built in the modern tool department of the Kellogg company, purposely designed to accomplish this standardization. As shown in the accompanying illustration, this apparatus has four heads, and, is, therefore, capable of testing four spools of wire at the same time.

The method of testing consists in leading the wire through a bath of mercury, from which electrical connections are made to a service relay, which registers the number of breaks in the total length of the wire on any spool. Suitable mechanical means are embodied in the machine, so that at the end of a test of any spool of wire, the total number of feet of wire on the spool is also known. Knowing these two quantities, the average number of breaks for a given length of wire is also known, which is the only criterion for judging the quality of enameled wire.



Special Machine For Testing Enameled Wire in Kellogg Factory.

The speed of the machine is such that an average of 20 feet of wire per minute is tested from each spool. The speed of testing is not constant, but varies with the diameter of the spool and the amount of wire on it. The machine is able to test any size of wire between No. 40 and No. 18 B. & S. gage. This apparatus is motor-driven and requires very little attention besides the changing of spools.

OUR EXTRA HEAVY DOUBLE GALVANIZED WIRE INSURES

HIGHEST EFFICIENCY.
LONGEST LIFE.
LOWEST COST OF UPKEEP.

It's easy to determine, TEST IT.

As wire will test best, so also will it last best and give better satisfaction while it lasts.

We guarantee our wire to conform with all standard specifications as well as to be satisfactory to the purchaser.

IT'S THE ONE BEST PROVEN BY TEST.—*TRY IT.*

Handled by most representation jobbers and supply houses.

Write for samples, test and compare.

INDIANA STEEL & WIRE COMPANY
MUNCIE INDIANA U. S. A.

August 3rd
1916.

OSHKOSH MFG. CO.,

Oshkosh, Wis.

"THE LAW OF McGRAW IS QUALITY"
OSHKOSH TOOLS

Gentlemen:-

In the National Electrical Jobbers Association it is customary once a year for the Jobbers to turn in their ratio of selling expense to sales in order to get a comparison of the efficiency of the members' sales departments. No names are used in publishing these figures, but each member, of course, knows his own figures and it has been with considerable pride that we have noted our ratio of sales expense is usually among the lowest.

We attribute the above showing, not to any superior sales ability, but to the fact that we select the best the market affords in each line of goods we handle. The old saying - "A satisfied customer is the best advertisement" is perfectly true and we believe that the reason we do such a large business in line construction tools is simply the fact that we handle OSHKOSH TOOLS. They are the best the market affords and go to help us make good on our slogan; "THE LAW OF McGRAW IS QUALITY"

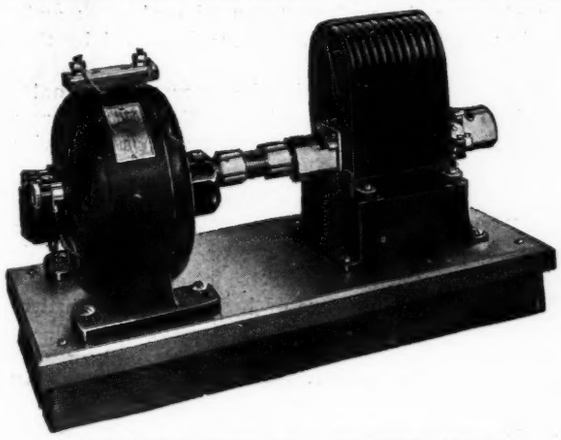
Wishing you every success, we are,

Yours very truly,

THE McGRAW COMPANY

President.

BUY A HOLTZER-CABOT MAGNETO RINGING
MOTOR GENERATOR
AND RING YOUR SUBSCRIBERS WITHOUT BATTERIES



YOU WILL FIND IT A BETTER WAY

To begin with, war has sky-rocketed the price of batteries. Then again, run down batteries are the source of many troubles:
Operators complain that they "can't raise subscribers."
Subscribers complain about "poor service."
The manager spends much time tinkering with the worn out batteries, and perhaps travels many miles to locate probable trouble in the phone itself—all to no purpose.
PROVIDE YOURSELF WITH A STRONG, CONTINUOUS RINGING CURRENT, BY THE PURCHASE OF OUR MAGNETO RINGING MOTOR-GENERATOR.

The Holtzer-Cabot Electric Company
Chicago, Ill. and Boston, Mass.

Mr. McGraw's opinion is the opinion of his entire trade---

If his customers had not found by experience that the **Oshkosh** tools were the very best made—the **McGraw Company** would not handle them.

Oshkosh jobbers are scattered all over the United States.

Oshkosh Mfg. Company

Oshkosh, Wisconsin

Every branch of the Western Electric handles the OSHKOSH line.

See that this mark is on every tool if you have asked for the best.

TRADE MARK OSHKOSH

Together with this break test, micrometric measurements are made to ascertain the thickness of the enamel insulation, which is not allowed to vary more than 0.0001 of an inch.

Periodic examinations of the enamel are made under the microscope to ascertain the consistency of the enamel structure. Difference of color in colored enamels are also taken care of in order to insure a uniform product from this standpoint. The Kellogg company will send its booklet on enameled wire to those interested upon request.

Phoney Bill on the Cordless P. B. X. Board.

Phoney Bill, the "Quality Apparatus" booster of the Stromberg-Carlson Telephone Mfg. Co., is shown on this month's blotter calendar, the illustration on which is reproduced below, pointing with pride to the Stromberg-Carlson cordless P. B. X. board. This board occupies but little space, and may be placed upon the desk of a stenographer or typist. She is enabled to operate the P. B. X. board in addition to attending to her other duties, thus killing two birds with one stone, as Phoney Bill says.

Phoney Bill Says: "The Way to Kill Two Birds With One Stone."

The September blotter calendar also calls attention to the convention of the Indiana Independent Telephone Association, which was held at Indianapolis on Thursday and Friday of this week.

Test of Life of Cedar Poles.

The Lindsley Brothers Co., of Minneapolis, Minn., and Spokane, Wash., dealers in Western and Northern cedar poles, recently conducted an investigation to ascertain the present condition of some of the poles which it shipped in the Central West in 1899. Letters were sent out to a number of the concerns to whom it had furnished poles, asking them to report on the condition of their poles today. The replies in general indicate that poles set in 1899, 1900 and 1902 are in very good condition.

One user reports: "We consider the remaining poles, 90 per cent. of the total, are still in very good condition and should last at least five years longer, before it is necessary to reinforce them."

Another user at Louisville, Ky., states: "We have found the poles to be in good condition generally, some of them showing only 1 in. of rotten wood. Out of the total number, 60, only four poles show an amount of rot which would seriously impair the strength of the pole. Out of the 60 poles, two were replaced in 1913, due to a dry rot at the top of the pole. The other 58 are now in good condition above the ground and should last ten years at least."

Another letter from Dallas, Tex., states: "About 60 per cent. of the poles have been removed, not so much because of rot but rather on account of municipal regulation. These poles have been removed during the last three years, but would undoubtedly have been good for four or five years more. The probable life of the poles still standing is about five years."

Letters were received from eight concerns, all of whom have had their poles from 14 to 16 years.

The company also reports that, in addition, a special representative inspected poles that were shipped to Grand Rapids in 1900. These poles were still standing in the line, apparently in as good condition as when first set. On close investigation, however, rot was found just below the ground line, but not enough to weaken the pole in any way. The investigator, the company states, also found poles in Detroit which had been used since 1900.

Kellogg Exhibit at Indiana Convention.

At the tenth annual convention of the Indiana Independent Telephone Association, held at the Claypool hotel, Indianapolis, Ind., September 14 and 15, the Kellogg Switchboard & Supply Co. held a very interesting exhibition, displaying its latest apparatus, including the new low key-shelf type magneto switchboard and P. B. X. equipment, which is proving very popular.

A. J. Carter, general sales manager; B. H. Blake and J. A. Campbell, sales representatives of the Kellogg company, were hosts to many interested telephone men. Kellogg Bakelite receivers, keys and other Kellogg telephone and switchboard advantages were demonstrated.

The guests at the banquet found at each plate an attractive folder made up on deckle edge paper, containing the convention announcement and names of the officers of the association, the center pages having the words of the song, "America."

Each guest was given a souvenir, the ladies being presented with a plated brooch and the gentlemen with a bronze medallion, in the center of each being an embossed outline of the well known desk stand.

A school of instruction in telephony was conducted by W. S. Vivian, secretary of the United States Independent Telephone Association, his lectures being illustrated by slides showing the various types of exchanges and their operating requirements, which were furnished by the Kellogg company.

The switchboards used in the operators' school work were given to the association by the Kellogg company, and have proved a marked success in many years of service.

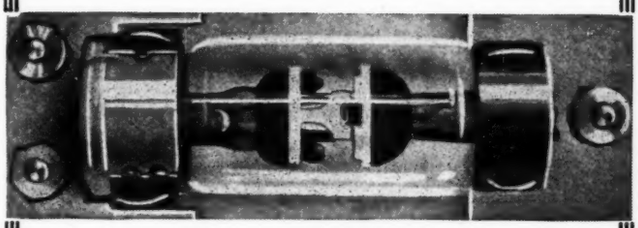
Paragraphs.

The Parker Supply Co., of New York, manufacturer of expansion shields, screw anchors, sheet metal screws and damper quadrants, has established a branch office at 627 W. Jackson boulevard, Chicago, in charge of J. S. Jacobson, to better serve the trade in the Middle West. A large stock of the various Parker products will be carried at the Chicago branch and the company assures its patrons of the same prompt and efficient attention to their business that they have always received from the main office in New York.

Stromberg-Carlson Exhibit at Indiana Convention.

The Stromberg-Carlson Telephone Mfg. Co., of Rochester, N. Y., exhibited a complete line of "Quality Apparatus" at the convention of the Indiana Independent Telephone Association, held in Indianapolis this week. By means of demonstration panels set in operating condition, the visitors were shown every step in the operation of central energy, lamp signal multiple switchboard circuits, including the latest developments in automatic circuit arrangement.

'VAC-M' Lightning Arresters
Are Always On The Job



(No. 3 Cartridge Type)

The two-line feature embodied in this make of vacuum arrester is well worth your careful consideration—the fact of each line discharging in the same evacuated container insures equal distribution and balance.

SEND FOR CATALOG—FREE.

The National Electric Specialty Co.
Terminal Bldg., Toledo, Ohio
Sole Makers of 'VAC-M' Arresters.

CB Knobs
For Drop Wiring
because they are the best knobs made for this kind of work.

Made in both Single and Double groove.

PRICE

Single Groove .....$30.00 Per M
Double Groove ..... 35.00 Per M

Write for discounts.
Weight, 25 lbs. per hundred pieces.

National Telephone Supply Co.
3922 Superior Ave. Cleveland, Ohio

"ADVERTISING SWELLS PROFITS BY SPEEDING THE TURNOVER"

REBUILT BARGAINS

International 4-bar 1600 ohm bridging compacts.....	$ 5.60
Dean Electric Company 3-bar 1000 ohm bridging common battery type magneto wall sets.....	4.85
Vote-Berger 3-bar 1000 or 1600 ohm bridging common battery type magneto wall sets.....	4.70
Williams-Abbott 3-bar 1000 ohm bridging compacts...	4.50
Kellogg No. 186 common battery (desk) straight line wood hotel sets.....	4.00
Kellogg No. 39 common battery desk sets complete with No. 75 straight line steel signal set.....	6.00
North Electric Company 3-bar 1000 ohm bridging compacts	4.75
Monarch No. 22 type 3-bar 1000 ohm bridging desk sets	6.30
Monarch No. 22 type 4-bar 1600 ohm bridging desk sets	7.25
Dean Electric Company No. 2315 direct current common battery Bull neck desk sets, straight line, $5.00; Harmonic with either 16-33-50 or 66 style ringer....	5.75
Stromberg-Carlson No. 681 type common battery desk sets complete with 659 steel signal set, straight line, $5.00; Harmonic with either 33-50 or cycle ringer....	5.50
Baird 4-bar Midget type compact cabinets.....	.65
New hand generator cabinets, 3-4 or 5 bar size.....	.35
Stromberg-Carlson No. 14A common battery induction coils	.30
Kellogg golden finish, 100-line capacity magneto switchboard fully equipped with 90 No. 3-A 100 ohm series and 10 No. 3-C 1000 ohm bridging self-restoring combined line drops and jacks, and the following operators' equipment: 10 pairs of plugs and cords, 10 listening and double ringer keys, 10 single supervision ring off drops, power and hand generator switch key, hand generator, operator's suspended type transmitter head band receiver and complete night equipment; also 13 feet of full capacity line cable from base of board.....	170.00

For complete list of Standard Apparatus refer to our Rebuilt Bargain Bulletin No. 6 (free on request). Stock received since Bulletin published shown in our Telephony ads.

REBUILT TELEPHONE EQUIPMENT CO.
2127-2129 W. 21st St. - Chicago, Ill.

Local battery and private branch exchange switchboards were also shown ready for service, in connection with the latest Stromberg-Carlson subscriber's station equipment.

Plant Work of a Pennsylvania Independent Company.

The Consolidated Telephone Co., of Hazleton, Pa., in its report for the six months ended May 31, 1916, states that during that period extraordinary property damage, caused by a sleet storm in December, 1915, was fully repaired at an approximate cost of $15,000. Extraordinary repairs and replacements were completed at a cost of $12,000, while an additional sum of $2,500 was expended for improvements on long distance lines. Work is now under way on additional reconstruction work involving an expenditure of $7,500.

Work on the rehabilitation of the plant in the Slatington district was completed at a cost of $2,500 and the Kutztown exchange was furnished with a new switchboard at a cost of $700. Work is now under way in Reading, Pa., on cable extensions and outside plant additions, the cost of which is estimated at $12,000. In the city of Scranton the company is placing its aerial lines in underground conduit, at an estimated cost of $7,000.

Since the organization of this company, actual plant rehabilitation work completed has involved the expenditure of $300,000, and current additions to plant have required the expenditure of over $100,000.

Condensed News Reports

Officers of Companies Are Urgently Requested to Forward to Us Promptly All Financial and Other Statements as Soon as Issued and Any Items of Interest as to Their Plants and Systems

New Companies and Incorporations.

NOGALES, ARIZ.—W. A. Getline and P. Patterson, residents of Patagonia, have made application to the supervisors of Santa Cruz county for a franchise to operate telephone lines along the public highways from Patagonia to Nogales, from Patagonia to Sonoita and Elgin, from Patagonia toward Fairbank, from Patagonia to Harshaw, up Harshaw Canyon and to San Rafael postoffice and vicinity.

WARREN, ARK.—The South Arkansas Telephone Co. of Warren has filed articles of incorporation. The incorporators are: H. Thame, D. A. Gates, W. J. Savage and W. J. Camp. The capital stock is $.5,000, of which $8,000 has been paid.

APALACHICOLA, FLA.—Apalachicola Electric Light & Telephone Co. has been incorporated, with the following officers: J. F. C. Griggs, president; R. H. Porter, vice-president; R. G. Porter, general manager.

BARNARD, IND.—The Barnard Telephone Co. has been organized with a capital of $950. The directors are H. A. Moreland, Elmer Newby, Charles Russell and Shelby Blaydes.

CHILHOWIE, MO.—The Farmers' Mutual Telephone Co. of Chilhowie has been incorporated and a meeting will be held shortly to organize.

SQUARE BUTTE, CHOTEAU COUNTY, MONT.—The Square Butte Telephone Co. has been incorporated. The incorporators are R. E. Champlin, S. T. Wiprud, S. D. McFarland, Robert W. Baokie and Harry K. Cohen. The capital is $2,500.

SIOUX PASS, MONT.—The Sioux Pass Farmers Exchange Co. has been incorporated with a capital of $9,975. The directors are C. S. Johnson, Carl Hunter and O. Running, all of Fair View, Mont.

HENSLER, N. D.—The Oliver County Telephone Co. has been incorporated with a capital stock of $25,000. The incorporators are Charles H. Wilcox, Clarence E. Wilcox and Burton S. Wilcox.

SNYDER, OKLA.—The Vickers Rural Telephone Co. has been incorporated by A. O. Grissom, R. G. Hardin and J. O. Nallon.

OLYMPIA, WASH.—The Elma Matlock Telephone Co., capitalized at $5,000, will provide a farmers' telephone system about Elma.

Construction.

DES MOINES, IOWA.—Arrangements have been made by the Iowa Telephone Co. for improvements at its Drake Park exchange to cost about $50,000. Two additions—an extension at the rear and a second story—will be made to the present structure. Work is expected to start at once. On account of the increase in number of telephones in the north part of town a larger switchboard and more room is needed, state company officials.

LYONS, KAN.—The Missouri & Kansas Telephone Co. intends to erect a new building to house its central office equipment in Lyons, the complete improvements to cost several thousand dollars.

WHITE CLOUD, KAN.—W. H. Stewart, the new manager of the Northeast Telephone Co., is replacing much of the old equipment with new.

GRAND RAPIDS, MICH.—The Citizens Telephone Co. has begun laying conduits preparatory to putting all its wires through Wyoming Park underground.

FLINT, MICH.—The Michigan State Telephone Co. is constructing additional toll lines for long distance service. The new work will total 29 circuits and will cost in the neighborhood of $400,000.

SIOUX PASS, MONT.—The recently organized Sioux Pass Farmers Exchange will build a new line between Sioux Pass and Fairview.

BISMARCK, N. D.—The Independent Telephone Co. is constructing a new 28-mile full copper circuit telephone line to Manning, to connect with the already completed line from that town to Killdeer.

GRAND FORKS, N. D.—The Tri-State Telephone & Telegraph Co. is planning extensions of its lines on a large scale, the plans calling for a laying of 30,000 feet of new cable.

SIOUX FALLS, S. D.—The Nebraska Telephone Co. has commenced the construction of a copper circuit between Ft. Pierre and Rapid City. The job will cost about $90,000, including installing 7,800 poles.

GALVESTON, TEXAS.—The Southwestern Telegraph & Telephone Co. is enlarging its plant and switchboard at Brenham.

Elections.

SAN DIEGO, CAL.—The Home Telephone Co. at its annual meeting elected the following board of directors: Horace B. Day, R. E. Thompson, L. E. Dadmun, C. L. Williams and Arthur Cosgrove. At the meeting of the directors, which was held immediately afterwards, the following officers were elected: President and treasurer, Horace B. Day; vice-president and general manager, R. E. Thompson; secretary, E. R. Thompson.

BUTLER, PA.—The annual meeting of the stockholders of the Peoples' Telephone Co. was held in the offices of the company recently. About 150 stockholders were present and participated in the election of directors, as follows: Daniel Younkins, J. Henry Troutman, T. M. Baker, H. W. F. Graham and T. J. Shufflin.

ROCHESTER, WIS.—The Burlington, Rochester & Kansasville Telephone Co. has elected L. L. McDonald, of Honey Creek, a director to fill the vacancy caused by the recent death of James J. McDonald. Harvey Spriggs, of Dover, was elected president; Fred Cooper, of Waterford, vice-president, and George W. Waler, of Burlington, secretary and treasurer.

Financial.

CHICAGO, ILL.—The Chicago Telephone Co. has declared its regular quarterly dividend of $2 per share, payable September 30 to stock of record September 29.

GASTON, IND.—The Gaston Home Telephone Co. has filed with the secretary of state and the county auditor, notice of an increase in its capital stock from $25,000 to $40,000.

Changes of Ownership.

MOROCCO, IND.—Arthur Carpenter, formerly of Morocco, who has been at Uniontown, Ky., for several years, has purchased the Remington, Ind., telephone plant.

WESTHALIA, KAN.—John M. Barnes has purchased the Westhalia telephone system of Justin Lynch. The new owner will put the system in good condition.